

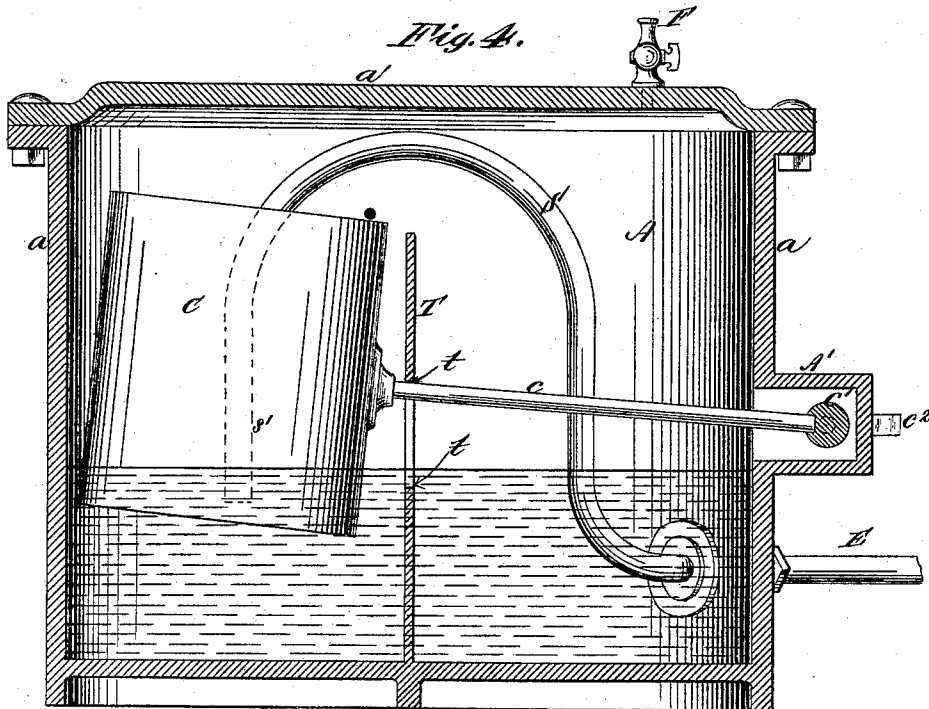
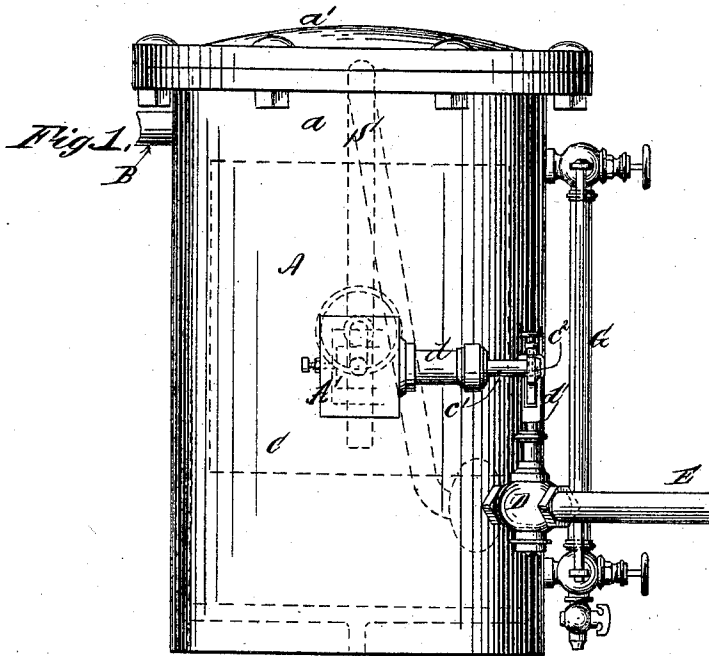
(No Model.)

2 Sheets—Sheet 1.

G. DINKEL.  
STEAM TRAP.

No. 380,791.

Patented Apr. 10, 1888.



Witnesses:  
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G. J. Maitt

Inventor:  
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By his attorney,  
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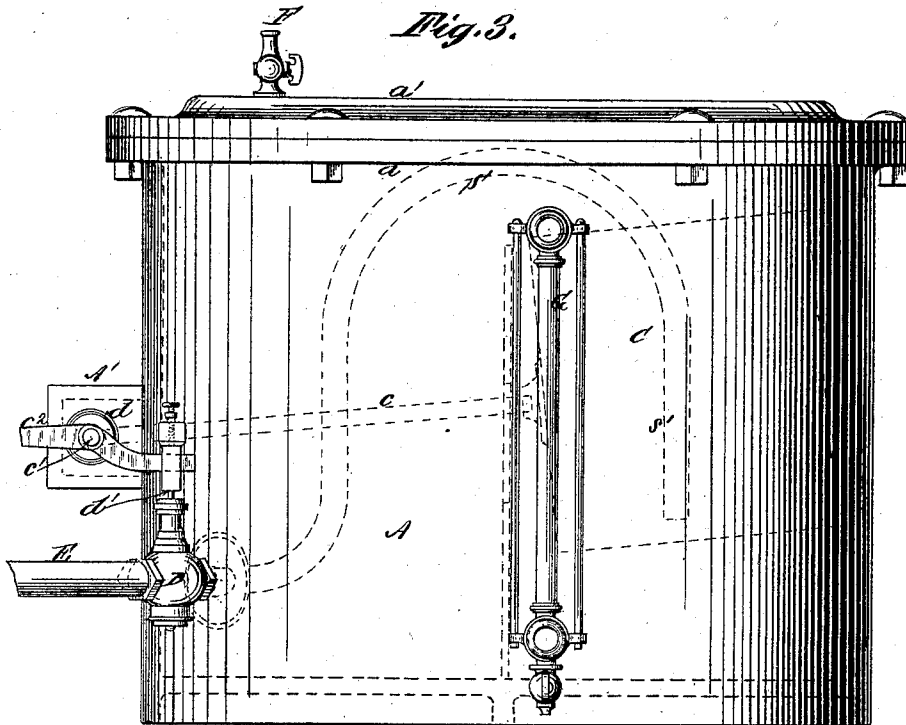
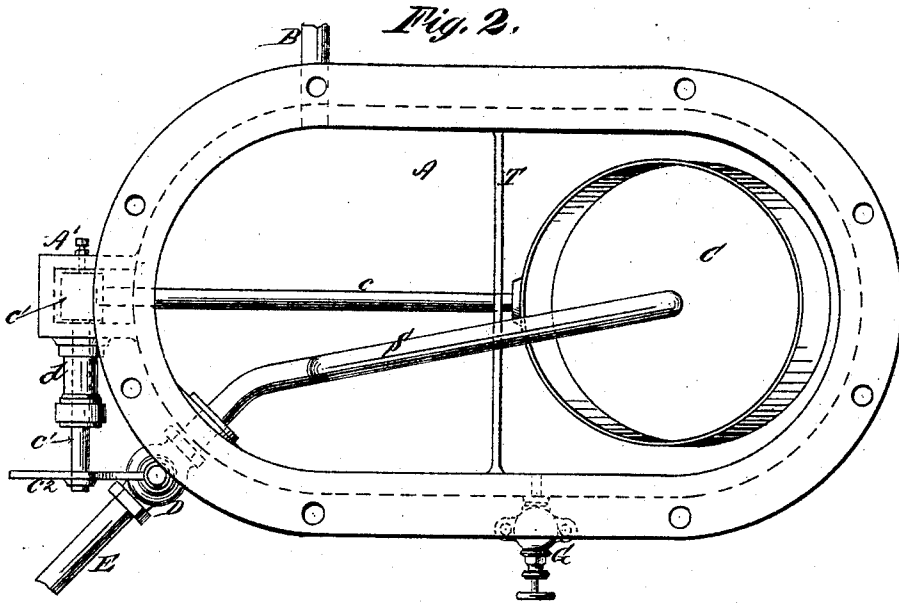
(No Model.)

2 Sheets—Sheet 2.

G. DINKEL.  
STEAM TRAP.

No. 380,791.

Patented Apr. 10, 1888.



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# UNITED STATES PATENT OFFICE.

GEORGE DINKEL, OF JERSEY CITY, NEW JERSEY.

## STEAM-TRAP.

SPECIFICATION forming part of Letters Patent No. 380,791, dated April 10, 1888.

Application filed November 15, 1887. Serial No. 255,269. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE DINKEL, a citizen of the United States, residing in Jersey City, in Hudson county, and State of New Jersey, have invented certain new and useful Improvements in Steam-Traps, of which the following is a specification sufficient to enable others skilled in the art to which the invention appertains to make and use the same.

My invention relates to an improved form of automatic steam-trap for taking off the liquid of condensation from steam pipes, coils, and apparatus employed in steam heating and evaporating. It is essential to the efficient and continuous working of such apparatus that the water of condensation shall be either returned directly to the boiler or constantly withdrawn by means which, while allowing the free discharge of the water, will prevent the escape or loss of steam. I am aware that this has heretofore been accomplished by various means more or less complicated or objectionable in practice for other reasons. One great objection to devices of this kind heretofore known has been the rapid deterioration of the discharge-valves through which the water of condensation escaped from the trap, owing to what is technically known as the "cutting" of the valve and its seat under the more or less continuous flow of the liquid of condensation, combined with a certain percentage of uncondensed steam or vapor, which is liable to accompany the discharge.

In the ordinary form of apparatus, in which a closed float and valve are used, the continuous fluctuating action in opening and closing alternately and slowly exposes the edges of the valve and its seat to the greatest possible amount of wear or cutting, and the apparatus soon ceases to work satisfactorily.

The main object of my invention is to obviate this difficulty by rendering the apparatus intermittent in its action in such manner that the valve is fully opened or closed by a comparatively quick movement in either direction.

My invention consists in the use, substantially as herein set forth, in an apparatus of the character designated of a discharge-valve connected with and operated by an open float or bucket and with a siphon-pipe arranged in

such manner as to convey the liquid contents of the said bucket-float to the said valve whenever the latter is opened by the fall of the bucket-float. The liquid contents of the bucket are quickly discharged, allowing the bucket to rise and the valve to completely close in a comparatively short space of time, in which position it is held until the liquid of condensation in the trap having reached a prescribed level overflows into the bucket and causes it to fall with such rapidity that the opening of the valve is almost instantaneous.

An incidental feature of my invention consists in combining and arranging the siphon and open bucket above referred to with a discharge-valve situated outside the trap, whereby I am enabled to increase the leverage exerted by the bucket upon the valve and render it more positive in its action, and at the same time render the operation of the trap readily apparent, and afford access to the valve at all times without opening or otherwise disturbing the apparatus.

In the accompanying drawings I show my improvements embodied in practical shape, although I do not wish to confine myself to the identical form and construction of parts herein represented, since it is obvious that various modifications in detail might be made without deviating materially from the essential features of my invention.

Figure 1 represents an exterior end elevation of my improved apparatus; Fig. 2, a top view of the same with the cover removed; Fig. 3, a side elevation; and Fig. 4 a longitudinal section of the apparatus upon plane of line *x x*, Fig. 1.

A is a closed chamber formed by the shell *a* and its cover *a'*, which are tightly secured together by bolts or screws. This chamber A is of any suitable capacity, and is adapted to receive the liquid of condensation, which is led into it from any of the sources, hereinbefore indicated, by the pipe B. An open float-bucket, C, is situated within the chamber A, attached to the end of a lever, *c*, which is fulcrumed at *c'* in such manner that the bucket is free to rise or fall vertically. The spindle or shaft *c'*, to which the end of the lever *c* is secured, extends out of the trap A through a suitable stuffing-box, *d*, and constitutes a rock-

shaft, to the outer end of which the valve-actuating arm  $c^2$  is attached. The valve D may be of any suitable or preferred form or construction, that shown in the drawings representing an ordinary globe-valve, the valve-stem  $d'$  of which is raised and lowered by an arm,  $e^2$ , of the rock-shaft  $e'$  in such manner that the fall of the bucket-float opens the passage to the discharge-pipe E, while its ascent closes the said passage.

The exterior valve, D, is connected with the lower or discharge end of the siphon-pipe S, which is situated in the interior of the trap A in such position that its shorter limb,  $s'$ , projects into the bucket C.

The extent of motion of the float-lever  $e$  and float-bucket C is limited in either direction by suitable stops or shoulders,  $t t$ , which may be formed and arranged in any desired manner. As shown in the drawings, they consist simply of the ends of a vertical slot formed in the partition T.

An offset,  $A'$ , is preferably formed in the side walls of the chamber A, in order to afford convenient bearings and means for mounting the rock-shaft  $e'$ , although this construction is non-essential so long as adequate means are provided for extending the rock-shaft outside of the chamber.

The trap may be provided with the usual petcock, F, gage G, &c., and may be varied in form and general arrangement to suit the requirements of special use. As shown and described, it combines simplicity and cheapness of construction with a high degree of efficiency and durability.

The operation is as follows: The accumulation of the liquid of condensation from the inlet B raises the float into the position shown in the drawings, in which it is held against further elevation by reason of its lever  $e$  coming in contact with the upper stop,  $t$ . When the level of the liquid of condensation rises above the edge of the bucket C, the liquid pours rapidly into the latter, causing it to fall suddenly and open the discharge-passage in the valve D, through the medium of the lever  $e$ , rock-shaft  $e'$ , and valve-rod lifter  $e^2$ , when, the way being now open, the liquid in the bucket C escapes through the siphon S and valve D into the discharge-pipe E, the excess of pressure within the chamber being always

sufficient to start the liquid over the higher level of the siphon. As the liquid is discharged from the bucket C, the latter again rises and the pressure in the chamber A closes the valve D until the liquid again overflows into the bucket, when the above-described operation is repeated.

By placing the discharge-valve outside the chamber A for a given size of trap I am enabled by the increased leverage thereby attained to use a comparatively large valve-opening and thereby facilitate the rapid discharge of the liquid at low pressure, whereas in many devices heretofore used a relatively-high degree of pressure has been essential in order to effect the discharge of the liquid with sufficient rapidity.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination and arrangement, substantially as herein set forth, with a closed chamber for the collection of the liquid of condensation, of a discharge-valve, and an open bucket-float which operates the said valve, substantially as described, and a siphon connected with the said discharge-valve and arranged to discharge the liquid of condensation from the said bucket-float, substantially in the manner and for the purpose described.

2. The combination and arrangement, substantially as herein shown and described, with a closed chamber for the collection of the liquid of condensation, of an exterior valve interposed in the discharge-passage and connected with and operated by an open float-bucket situated in the said inclosed chamber, and a siphon situated within the said chamber and communicating at opposite extremities with the bucket-valve and the said exterior discharge-valve, substantially in the manner and for the purpose described.

3. The combination, substantially as herein shown and described, of the closed chamber A, bucket-float C, lever  $e$ , rock-shaft  $e'$ , actuating-arm  $c^2$ , discharge-valve D, and siphon S, the whole arranged and operating substantially in the manner and for the purpose described.

GEORGE DINKEL.

Witnesses:

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