

A. G. DAVIDS.

Improvement in Fire Extinguishers for Steam Boilers

No. 123,874.

Patented Feb. 20, 1872.

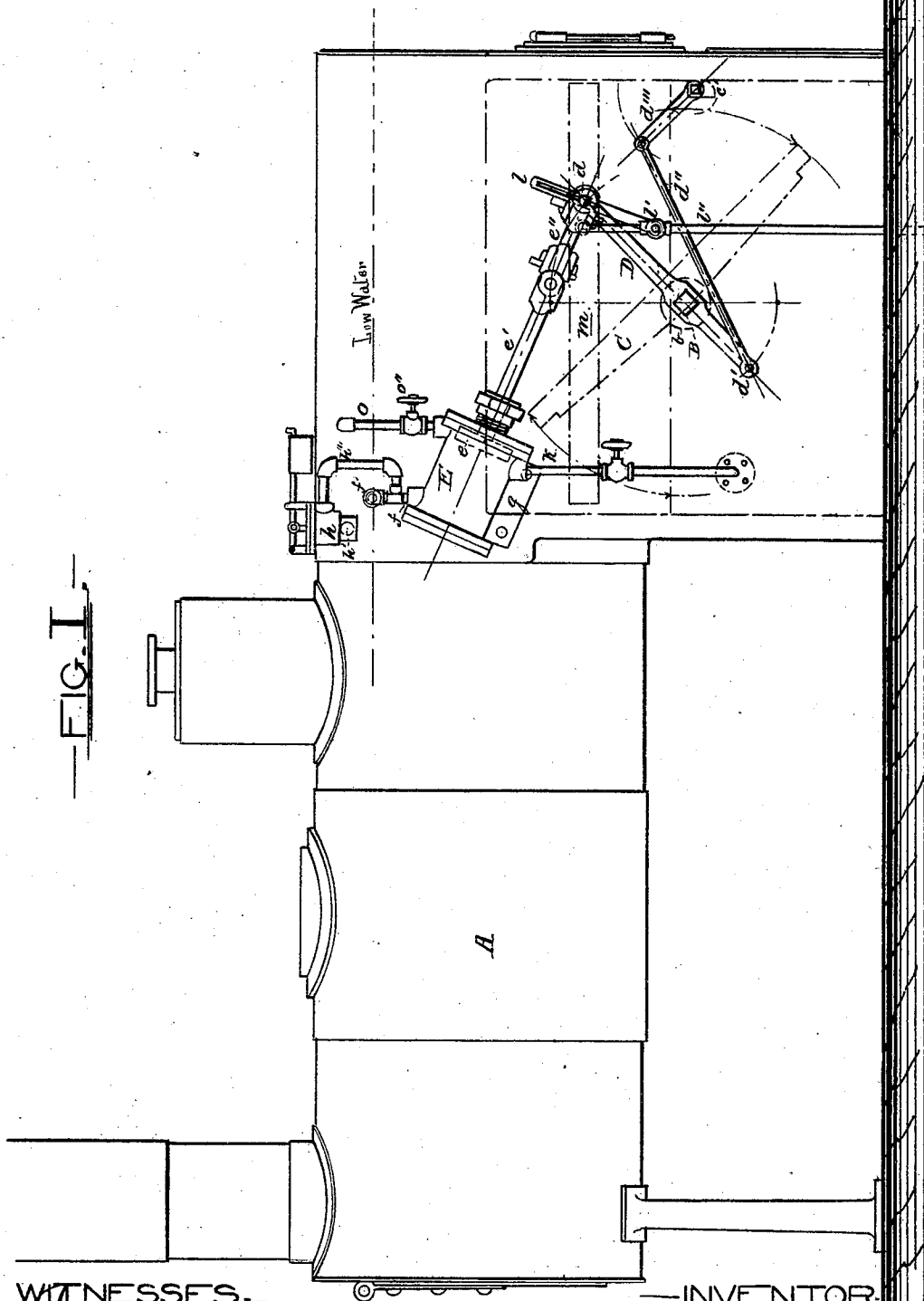


FIG. 1.

WITNESSES:

J. J. Lomades
Norton Cranford

INVENTOR:

Albert G. Davids,
per Geo. H. Howard, his atty

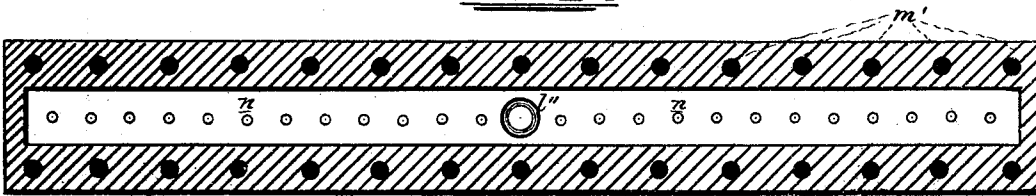
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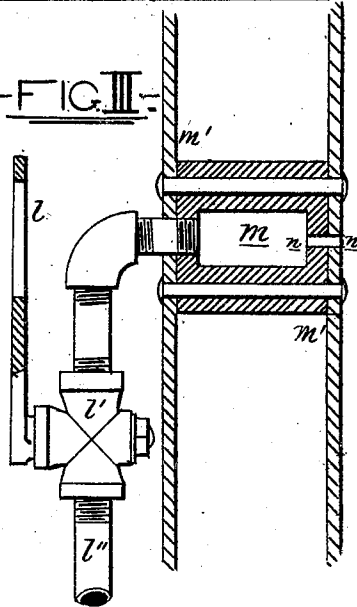
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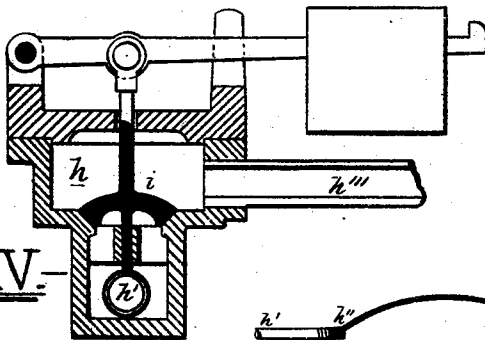
—FIG. IV.—



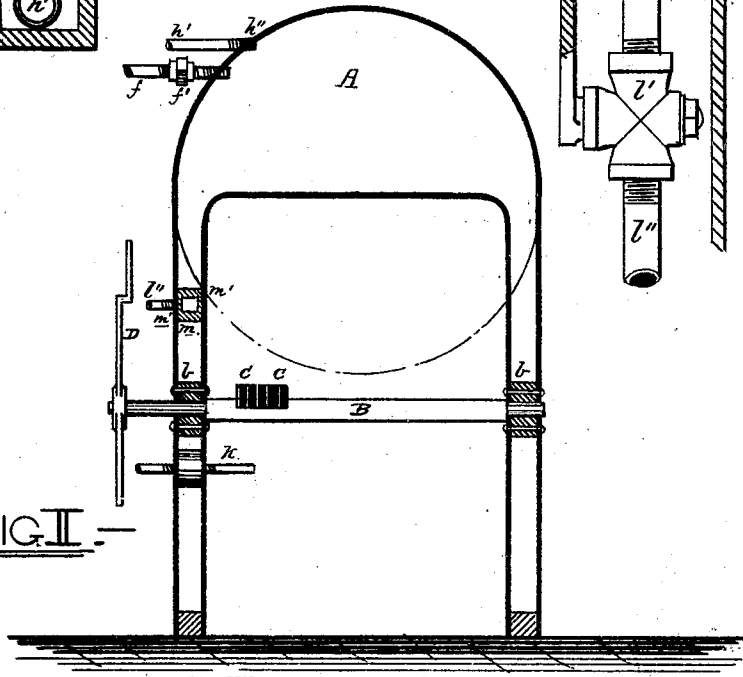
—FIG. III.—



—FIG. V.—



—FIG. II.—



—WITNESSES:—

H. A. Daniels
H. A. Daniels

—INVENTOR:—

Albert G. Davids,
by *Geo. H. Horass* *att'y.*

UNITED STATES PATENT OFFICE.

ALBERT G. DAVIDS, OF BALTIMORE, MARYLAND, ASSIGNOR OF ONE-HALF HIS RIGHT TO HENRY M. WARFIELD, OF SAME PLACE.

IMPROVEMENT IN FIRE-EXTINGUISHERS FOR STEAM-BOILERS.

Specification forming part of Letters Patent No. 123,874, dated February 20, 1872.

To all whom it may concern:

Be it known that I, ALBERT G. DAVIDS, of the city and county of Baltimore and State of Maryland, have invented certain Improvements in Steam-Boilers, tending to the safety of the same from explosion, which I designate as an "Automatic Dumping-Grate and Fire-Extinguisher Combined," of which the following is a specification; and I do hereby declare that the same is a full, clear, and exact description of my said invention, reference being had to the accompanying drawing and to the letters and figures of reference marked thereon.

In the following descriptive outline of my invention it will be seen that it relates to the means whereby, in the event of low water or high steam occurring, a grate poised or hanging upon a bar extending across the furnace is tilted and its contents dumped into the ash-pit or out upon the fire-room floor; and further, to measures adopted for allowing the escape of steam and water upon the fire thus upset. To effect this result I secure to the exterior of the boiler a steam-cylinder having attached to its piston-rod another rod, which, in turn, connects with the dumping mechanism of the grate. This consists in part of a double lever secured to the projecting end of the above-named bar extending across longitudinally in the center of the furnace. This bar is fitted within bearings suitably arranged at the sides of the furnace and acts as a pivot to the grate. The connecting-rod of the steam-cylinder unites with the upper arm of the lever at the end of the cross-bar, and when the grate is level or in its ordinary position, the upper and lower arms of the lever stand perpendicularly, the piston at this time occupying the back end of the steam-cylinder. A pipe is attached to the cylinder at a point in the space existing between the piston and the back end of the cylinder, which pipe rises and turns connecting with a "union" attached to the shell of the boiler. Within the "union" I place a metal plug prepared according to chemical laws, so that it shall fuse upon exposure to a stated temperature. The metal plug is placed upon the low-water level, and when the water falls below that point the plug is fused and the steam passes through the pipe into the cylinder. The

piston is thereupon carried forward with its attachments and the grate thrown to an angle of about forty-five degrees. At the same time a rod connecting with the lower arm of the lever upon the bar extending across the furnace operates upon a lever attached to the front bearing of the grate so as to upset or turn it, thereby allowing that end of the grate to fall without obstruction. As the piston moves forward it passes over an opening in the cylinder, to which is connected a pipe leading to the ash-pit through which the steam escapes thereinto. Another rod, attaching to the upper arm of the lever, operates upon the handle of a cock which admits water from a hydrant-pipe, or other source, into a perforated iron pipe inserted within the water-space of the boiler above the grate-bars and thence into the furnace. As a preventive against danger arising from high steam, I provide a pipe leading from the steam-space of the boiler into the globe or chamber of a safety-valve at a point below the lifting valve. Another pipe attaching to the globe or chamber above the valve connects with the aforesaid pipe having the union and fusible plug leading to the cylinder.

In the further description of my invention which follows due reference must be had to the accompanying drawing, in which—

Figure 1 is a side elevation of a boiler having my invention applied thereto. Fig. 2 is a vertical transverse section through the furnace of the boiler. Fig. 3 is an enlarged cross-section of the perforated water-pipe. Fig. 4 is a longitudinal section of the same. Fig. 5 is an enlarged section of the safety-valve.

Similar letters of reference indicate similar parts of the invention.

A is the boiler. B is the bar extending through the furnace, which acts as a pivot to the grate. The bar B rests in bearings *b* riveted to the inner and outer sheets of the furnace. C C represent the grate-bars. The front bearing of the grate is shown by *c'* and has bearings similar to those of the bar B. D is a double lever attaching to the bar B. E is the steam-cylinder, of which *e* and *e'* are, respectively, the piston and piston-rod. The cylinder bolts to the side of the boiler, as shown at *g*. A connection is made to the arm

D at d and the piston-rod by the rod e'' . To the lower arm of the lever at d' connection is made by the rod d'' to the lever d''' attached to the movable front bearing e' . The steam-pipe to the cylinder is represented by f , and has a "union," f' , where it connects to the boiler. Within this union is placed the fusible metallic plug hereinbefore mentioned, the "union" clamping it so that it shall form a tight joint therein. A safety-valve is shown by h having a pipe, h' , leading from its chamber or globe below the valve i and attaching to the boiler at h'' . Another pipe, h''' , connects with the globe or chamber above the valve joining with the pipe f . We will now suppose the water in the boiler, by mismanagement or otherwise, to have fallen below the plug at f' . The steam thereupon fuses the metallic plug in the "union" and passes through the pipe f to the cylinder E, operating upon the piston e and rod e' , and parts e'' , D, B, d'' , d''' , and e' , so as to throw the grate C into the position indicated in Fig. 1. The fire consequently falls into the ash-pit or upon the fire-room floor. When the piston in its forward movement passes the pipe k the steam issues through it into the ash-pit upon the upset fire. By the same forward movement of the lever D the rod l attaching thereto at d is caused to open a cock, l' , in the pipe l'' , which leads into the perforated iron pipe m . The pipe m is riveted in the water-space between the inner and outer furnace sheets of the boiler, as shown at m' . The holes n in the pipe continue through the inner furnace-sheet, as represented by n' , and the water is injected through them into the furnace. The pipe l'' may lead from a hydrant-pipe or other source where a pressure of water is found. The pipe o attaching to the cylinder and boiler is used to supply the cyl-

inder with steam to force the piston back when the grate is to be replaced to its ordinary position. A stop-cock in this pipe is shown at o'' .

It is obvious from the foregoing description of my invention that in it is embodied a safety-attachment guarding against danger from low water and over pressure. I believe it to be economical, simple, cheap, not liable to get out of repair, and easily applied to stationary or locomotive boilers. It is well adapted to locomotive or other boilers wherein the coal remaining in the furnace after the work of the engine is over for the day is usually allowed to burn out. By the use of this invention the coal can be readily dumped, the fire extinguished, and the waste prevented.

Having thus described my invention, what I claim as new, and wish to secure by Letters Patent, is—

1. A fusible plug at the low-water level of a steam-boiler, a steam-cylinder and piston, and a tilting grate, with intervening pipe and mechanism, all in combination substantially as and for the purposes set forth.
2. A safety-valve, a steam-cylinder and piston, and a tilting grate, with intervening pipe and mechanism, all in combination substantially as set forth, for the purposes specified.
3. The perforated pipe m , and its combination with the inner and outer sheets of the furnace, substantially as described, for the purpose set forth.
4. The combination of the water-pipe l'' with the cock l' , rod l , perforated pipe m , and lever D, when arranged substantially in the manner as set forth, for the purposes herein named.

A. G. DAVIDS.

Witnesses:

WM. NEAL,
CLIFFORD C. ANDERSON.