2 Sheets—Sheet 1.

G. W. DOOLITTLE.

Steam-Boilers.

No. 212,909. **Patented Mar. 4, 1879.**

Fig. 1.

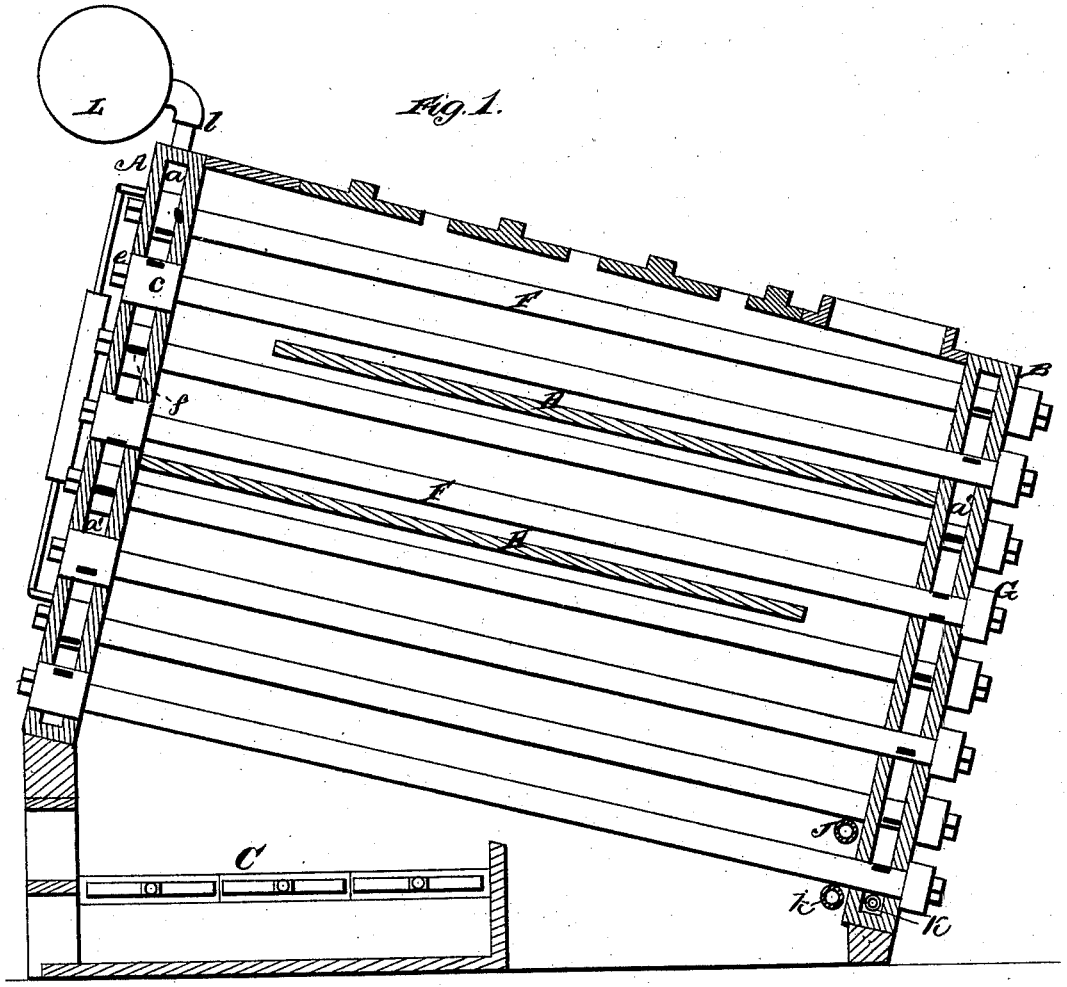
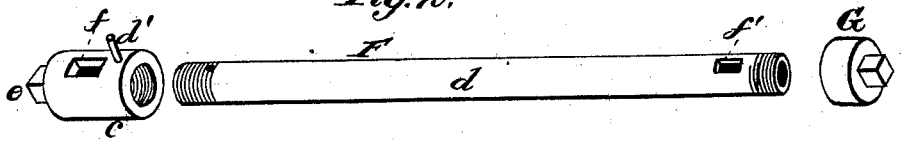


Fig. 2.



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2 Sheets—Sheet 2.

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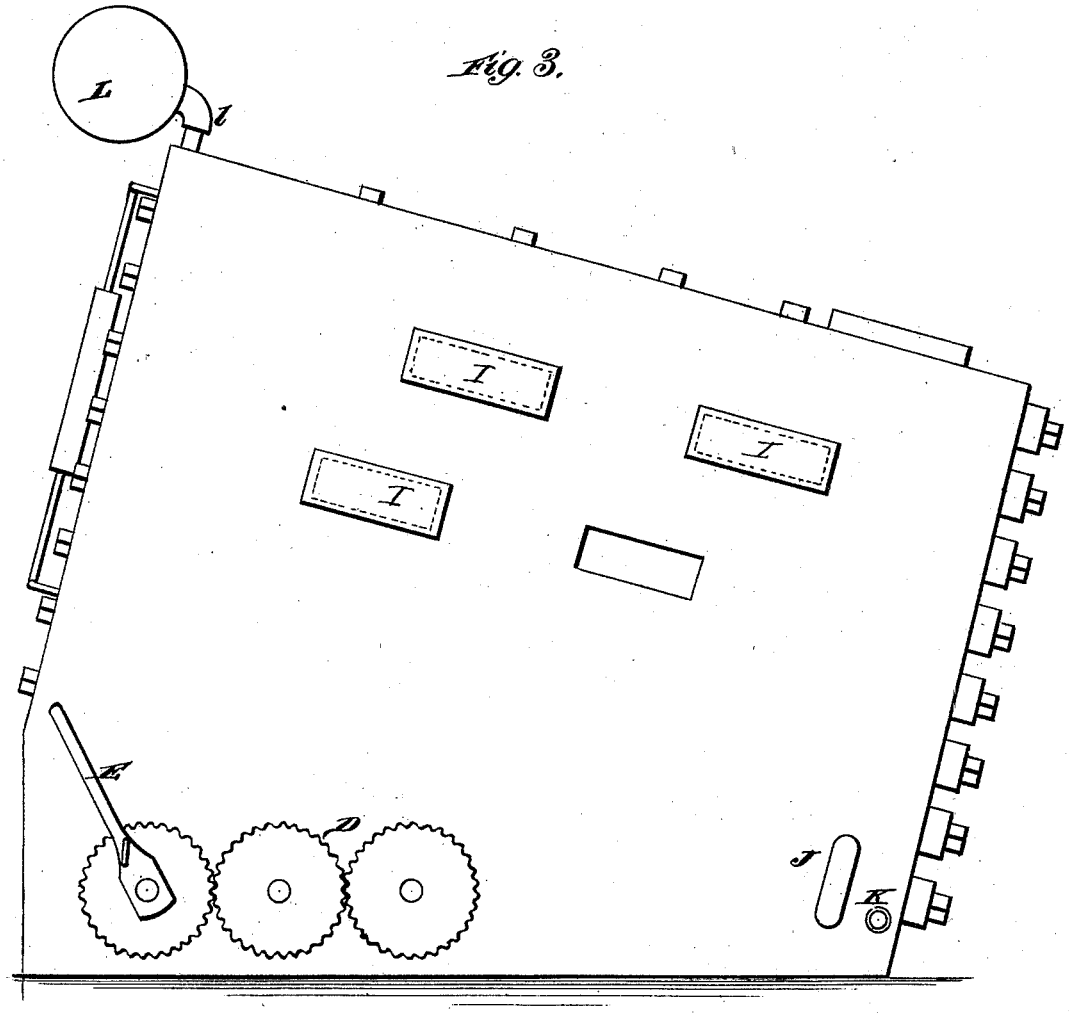
Fig. 3.



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UNITED STATES PATENT OFFICE.

GEORGE W. DOOLITTLE, OF MONTROSE, PENNSYLVANIA.

IMPROVEMENT IN STEAM-BOILERS.

Specification forming part of Letters Patent No. **212,909**, dated March 4, 1879; application filed January 4, 1879.

To all whom it may concern:

Be it known that I, GEORGE W. DOOLITTLE, of Montrose, in the county of Susquehanna and State of Pennsylvania, have invented a new and valuable Improvement in Steam-Boilers; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a vertical central section of my steam-boiler. Fig. 2 is a perspective view of one of the tubes; and Fig. 3 is a side elevation of the steam-boiler.

This invention has relation to tubular steam-boilers; and it consists in the improvements in the construction of the same, hereinafter fully described, and particularly pointed out in the claim.

In the accompanying drawings similar letters of reference indicate corresponding parts in the several figures.

The boiler, fire-box, and ash-pit are incased in a brick shell having a top composed of iron plates. The front and rear boilers-heads, A and B, are each double heads, having steam and water spaces *a a'* from top to bottom. Both heads are securely bolted by bolts in the ordinary manner. The grate C is made in sections, as shown, operated by gear-wheels D and a lever, E; but no claim is made to this portion of the device.

The tubes F employed in this boiler are constructed as follows: The portion *c*, located in the front head, A, is about one-third larger than the portion *d*, extending the length of the boiler, is screwed upon the portion *d*, and secured by a pin, *d'*, when in place in the boiler-head A. A nut, *e*, is provided for unscrewing the portion *c* after removing the pin *d'* when the tube F has been withdrawn from the head A after having been bursted, or for other cause. Slots *f f* are made in the portion *c* at opposite sides thereof, to permit the passage of steam and water through the same and through the space *a* in the head A. The portion *d* of the tube F is slotted in a similar manner at *f'* at the other end, to communicate with the space *a'* in the head B, and is screw-threaded, to receive a cap, G, upon the outside of the head B. The heads A and B are, of course, perforated, to receive the tube F.

Any suitable number of tubes, F, may be employed to form the boiler, and the tubes are inclined from front to rear, so that the mud will settle in the rear ends of said tubes. The tubes F are arranged in layers, and two or more sheets, H, of sheet-iron are interposed between alternate layers of tubes, to direct the fire against them properly in its course to the smoke-stack. The sheets H are held in place by bolts passed through the brick wall from the outside. Doors I are made in the brick wall at proper places, through which the ashes that settle upon the sheets H may be removed. A water-pipe, J, traverses the boiler at its rear end near the bottom, and the water by which the boiler is fed passes through this pipe, and is heated by the fire before reaching the tubes F. K is a blow-off pipe near the rear lower corner, through which the mud in the tubes is blown off. L is a steam-dome connected by pipes *l l* leading from the space *a* in the front head, A, and the steam therein contained is utilized and conveyed wherever wanted.

The pipe K is located at the bottom of the head B, and through this pipe the mud and sediment are blown off.

The tubes F can be readily removed for cleaning, repairing, or replacing, and the advantages thereby gained are obvious.

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

In a tubular steam-boiler, the tube F, consisting of the portion *c f*, provided with the nut *e*, and the portion *d*, provided with opening *f'*, and having the cap G, constructed and operating substantially as set forth.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

GEORGE W. DOOLITTLE.

Witnesses:

W. T. HENSTOCK,

S. S. BLASDELL.