

R. L. MORGAN.

BOILER.

(Application filed July 6, 1901.)

(No Model.)

Fig. 1.

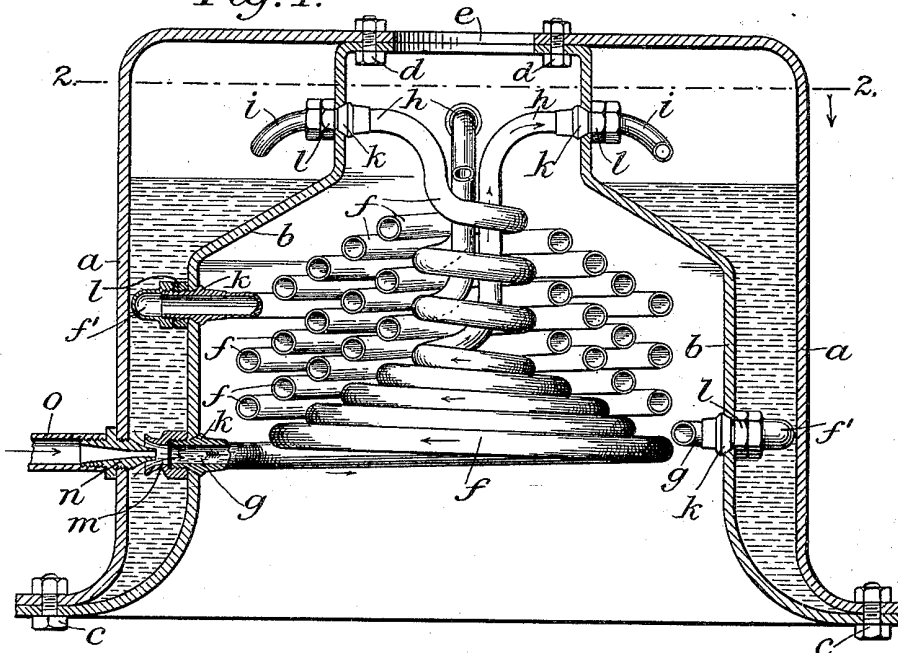


Fig. 2.

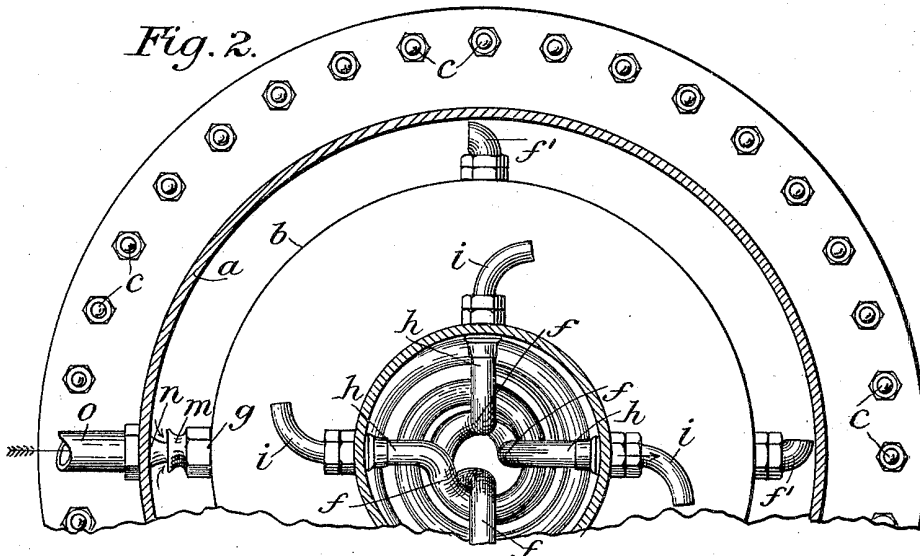
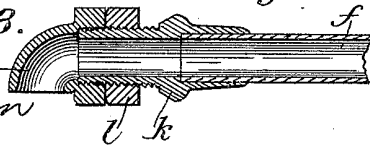


Fig. 3.

WITNESSES:

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INVENTOR..

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RALPH L. MORGAN, OF TOLEDO, OHIO, ASSIGNOR TO AMERICAN BICYCLE COMPANY, OF JERSEY CITY, NEW JERSEY, AND NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

BOILER.

SPECIFICATION forming part of Letters Patent No. 690,981, dated January 14, 1902.

Application filed July 6, 1901. Serial No. 67,297. (No model.)

To all whom it may concern:

Be it known that I, RALPH L. MORGAN, a citizen of the United States, residing in the city of Toledo, county of Lucas, and State of Ohio, have invented certain new and useful Improvements in Boilers, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

This invention relates to boilers of that class which are adapted for steam-driven motor-vehicles and other like use, which contain a comparatively small quantity of water subject to the heat of the furnace, while provision must be made for the supply to the boiler of a sufficient quantity of water to keep up the generation of steam for the required time.

The object of the invention is to provide a boiler which shall be capable of generating steam rapidly, while at the same time it shall have as few joints as possible to occasion leakage.

A further object is to make provision for the introduction of the feed-water in such a manner as to have as little effect as possible in the reduction of steam.

The invention will be more fully described hereinafter with reference to the accompanying drawings, in which for purpose of illustration and explanation it is shown as embodied in a boiler of convenient practical construction.

In said drawings, Figure 1 is a view in vertical central section of a boiler which embodies the invention, some of the coils being shown in elevation. Fig. 2 is a sectional plan view thereof on the plane indicated by the line 2 2 of Fig. 1. Fig. 3 is a detailed view of the tube-joint shown on a smaller scale in Fig. 1.

The improved boiler comprises an outer shell *a* and an inner shell *b*, both the outer shell and the inner shell being preferably flanged outward at their bases and secured directly together, as by bolts or rivets *c*, as indicated in Fig. 1. Both of the shells are more or less bell-shaped, somewhat as shown, and the inner shell is flanged inwardly at its

top and secured to the outer shell, as by bolts or rivets *d* around the central opening *e*, for the escape of the products of combustion from the furnace. The arrangement and shape of the inner and outer shells, substantially as described, provides between the shells an ample water-space and steam-space with good generating-surface, while the water is maintained at the proper level, and requires only two joints, besides affording a boiler well calculated to resist considerable internal pressure.

Within the inner shell *b* are located one or more coils *f*, which are preferably conical and are superimposed one upon another in such a manner as to secure the maximum results from the heat of the furnace. In Fig. 1 of the drawings one of such coils is shown complete, while portions only of the other coils are represented, and in Fig. 2 the upper ends of the four coils are shown. It will be understood that the number of coils may be varied as circumstances may render desirable. Each coil communicates at its lower end, as at *g*, with the water-space between the outer shell *a* and the inner shell *b*, above referred to, and at its upper end, as at *h*, with the annular space between the two shells preferably above the normal water-level, the ends or extensions of the coils within the steam-space being preferably turned in the same direction, substantially parallel with the circumference of each shell in a substantially horizontal plane, so as to give the water and the steam a rotary or swirling motion in the space between the inner and outer shells, thus assisting the separation of the dry steam. The arrangement of the coils in the manner described promotes a rapid circulation of water from the water-space between the shells *a* and *b* through the tubes and again into the water-space, the generation of steam obtained in this manner being very free. The circulation of the water is further promoted by placing over the inlet of each tube *f*, except that into which the feed-water is injected, a hood *f'*, which opens in a direction opposite that in which the nozzles are turned. By reason of the swirling motion imparted to the water and the projection

of the hoods f' into the current the circulation of the water through the tubes is promoted.

For the purpose of making a tight joint between the end of each tube and the inner shell b one end of the tube, or it may be an extension thereof, may be formed with a conical shoulder k to cooperate with a similarly-formed seat in the shell b . A nut l is threaded upon the extension of the tube beyond the shell b and when set up draws the conical shoulder k closely to this seat, thus making a very tight joint with little difficulty.

For the purpose of introducing the feed-water one of the tubes f is provided within the annular space between the two shells a and b with a bell-mouth m , and the nozzle n of the feed-water pipe o is extended through the outer shell a in line with the mouth of such pipe f . The feed-pipe o , being connected to the usual feed-pump, (not shown,) injects the water as a jet into the mouth of the pipe f , setting up an aspirating action, so that the hot water in the water-space of the boiler is drawn into the tube with the feed-water, immediately raising the temperature thereof, so that no bad effects are produced by the introduction of the feed-water directly into one of the coils and so that there is no reduction of steam.

It will be understood that the invention is not to be limited to the precise construction and arrangement of parts shown in the drawings, since the construction and arrangement may be varied without departing from the spirit of the invention.

I claim as my invention—

1. A boiler comprising an outer shell and an inner shell, both of said shells being substantially bell-shaped and being secured directly together at their tops and bases, substantially as shown and described.
2. A boiler comprising an outer shell and an inner shell secured directly together at their tops and bases and a coil within the inner shell, said coil having its ends secured to said inner shell and communicating with the annular space between said shells, substantially as shown and described.
3. A boiler comprising an outer shell and an inner shell both of said shells being substantially bell-shaped and secured directly together at their tops and bases, and a plurality of coils superimposed one upon another within the inner shell, the ends of each coil

being secured to the inner shell and communicating with the annular space between said shells, substantially as shown and described.

4. A boiler comprising an inner shell and an outer shell forming a water-space between them, a coil having its ends secured to the inner shell and communicating with the space between said shells, one end of said coil having a bell-mouth within the space between the shells, and a feed-water nozzle in line with said bell-mouth, substantially as shown and described.

5. A boiler comprising an inner shell and an outer shell, both of said shells being substantially bell-shaped, and secured together at their tops and bases, a coil within the inner shell having its ends secured to said inner shell, connecting with the space between said shells, one end of said coil having a bell-mouth in the water-space between the shells, and a feed-water nozzle extended through the outer shell in line with said bell-mouth, substantially as shown and described.

6. A boiler comprising an inner shell and an outer shell forming a water-space between them, and a coil located within the inner shell and having its inlet end communicating with the space between the shells below the water-level and its outlet end extended into the space between the shells and turned in a substantially horizontal plane substantially parallel with the circumference of each shell, substantially as shown and described.

7. A boiler comprising an inner shell and an outer shell forming a water-space between them, and a coil located within the inner shell and having its inlet end communicating with the space between the shells below the water-level and its outlet end extended into the space between the shells and turned in a substantially horizontal plane, substantially parallel with the circumference of each shell, the inlet end having a hood opening within the space between the shells in a direction opposite that in which the extension of the outlet end is turned, substantially as described.

This specification signed and witnessed this 8th day of June, A. D. 1901.

RALPH L. MORGAN.

In presence of—
J. E. TALTY,
H. L. POPE.