

No. 837,544.

PATENTED DEC. 4, 1906.

L. G. BUGBEE.
STEAM GENERATOR.

APPLICATION FILED JAN. 30, 1906.

Fig. 1.

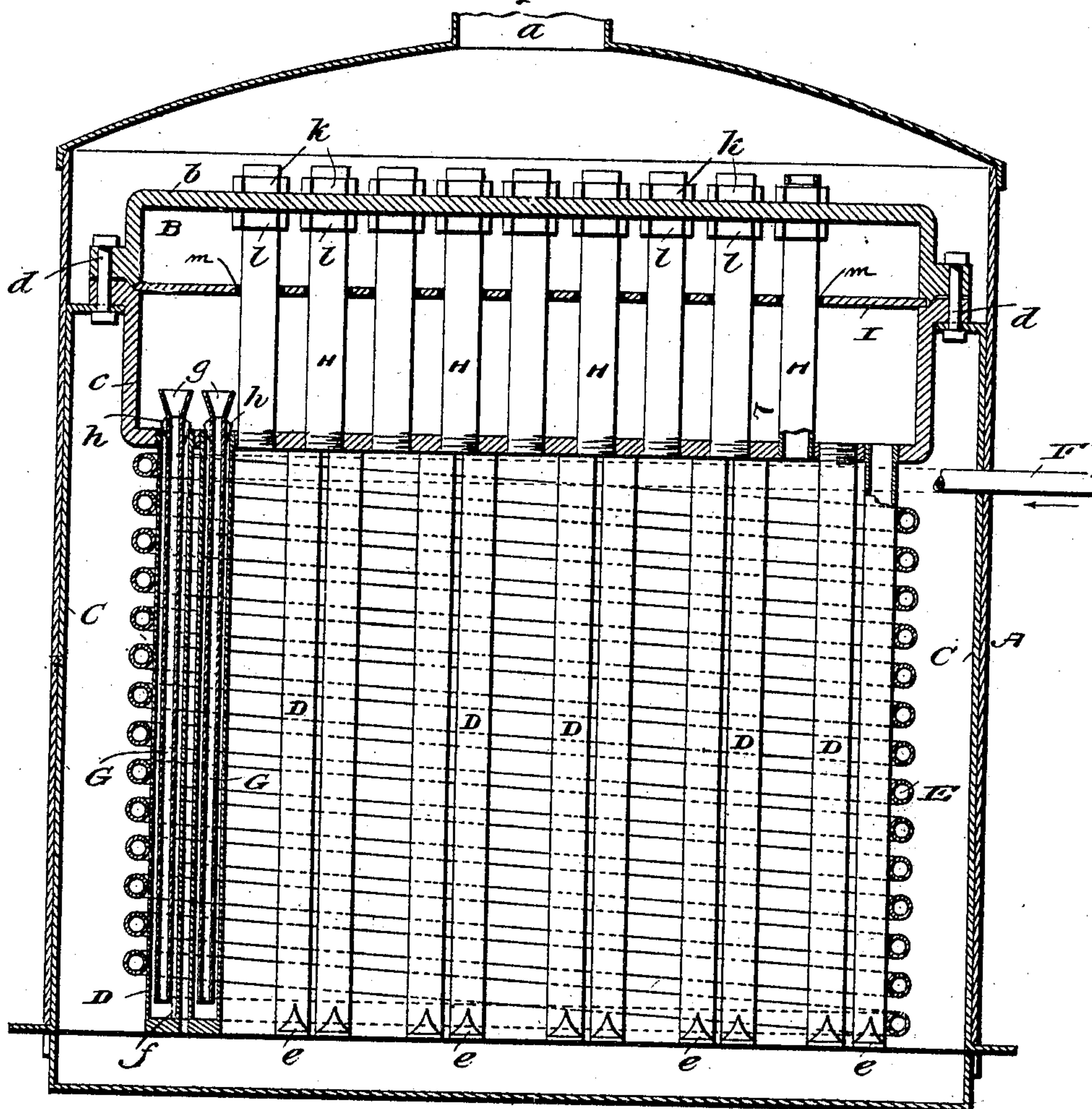
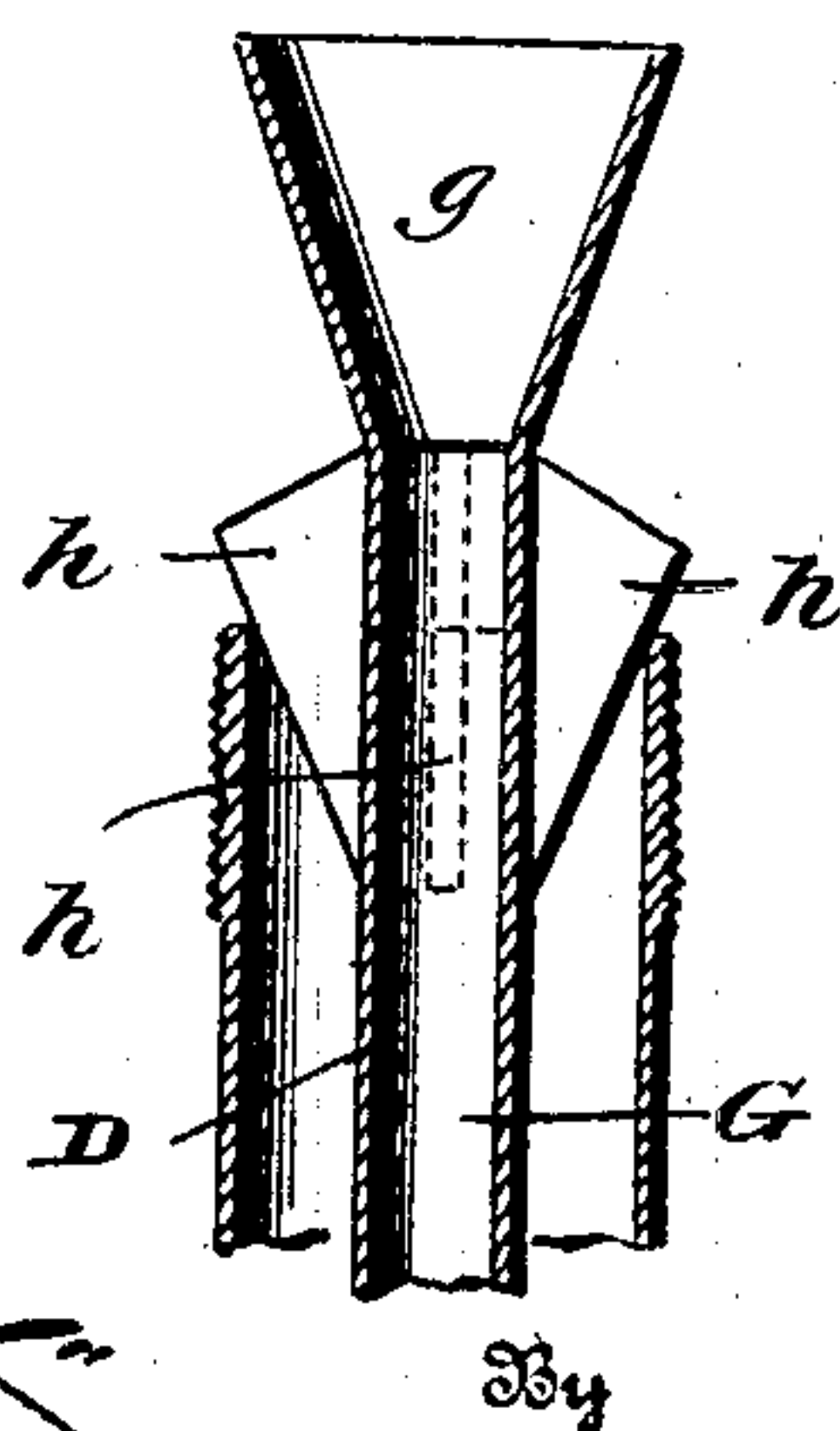


Fig. 2.



Witnesses

[Signature]
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UNITED STATES PATENT OFFICE.

LOUIE G. BUGBEE, OF POLO, ILLINOIS.

STEAM-GENERATOR.

No. 837,544.

Specification of Letters Patent.

Patented Dec. 4, 1906.

Application filed January 30, 1906. Serial No. 298,710.

To all whom it may concern:

Be it known that I, LOUIE G. BUGBEE, a citizen of the United States, residing at Polo, in the county of Ogle and State of Illinois, have invented new and useful Improvements in Steam-Generators, of which the following is a specification.

My invention pertains to steam-generators; and it contemplates the provision of a simple, compact, and highly-efficient semi-flash generator designed more particularly for use in motor-vehicles and interurban car service or where large capacity and small space is required.

The invention will be fully understood from the following description and claims when the same are considered in connection with the accompanying drawings, forming part of this specification, in which—

Figure 1 is a view, partly in elevation and partly in vertical section, of the generator constituting the present and preferred embodiment of my invention. Fig. 2 is an enlarged detail section illustrating one of the water-tubes and the circulating-tube therein.

Similar letters designate corresponding parts in both views of the drawings.

Referring to the drawings, A is the jacket or case of the generator. This jacket or case is designed to contain in its lower portion a burner, which I have deemed it unnecessary to illustrate, and is provided at its top with an outlet *a* for smoke and other products of combustion.

B is a shell located in the upper portion of the jacket or case A. The said shell is preferably made up of upper and lower sections *b c*, of cast-steel or boiler-steel, and bolts *d*, connecting said sections together, and it is preferably supported in the jacket or case through the medium of leg-brackets C, which extend upwardly inside of the jacket or case and have inturned arms at their upper ends connected by the bolts *d* and outturned arms at their lower ends extending through the jacket or case, as shown, and designed to be arranged on and connected to supports. (Not illustrated.)

D D are water-tubes, which vary in number with the size of the generator. These water-tubes D have upper open ends exteriorly threaded and screwed into apertures in the bottom of the shell B and also have lower ends, which are preferably closed by welding and are provided with flat surfaces, as indicated by *e*, so that an ordinary wrench is the

only tool necessary to connect the water-tubes to or disconnect said tubes from the shell B.

E is a water-tube having superposed coils surrounding the water-tubes D. At one end the said tube E is designed to be connected with a feed-pipe F, which extends outside the jacket or case, and at its opposite and lower end the tube is connected to the lower portion of one of the water-tubes, as indicated by *f* in Fig. 1.

G G are circulating-tubes disposed in the water-tubes and extending from a point adjacent to the lower closed ends of said water-tubes to a point above the upper ends thereof. These circulating-tubes are open at their lower and upper ends and are provided at the latter ends with funnels *g* to facilitate the downward flow of the cool water. Said circulating-tubes are also provided with tapered fins or wings *h*, which rest in the upper ends of the water-tubes D, and thereby support the circulating-tubes in the water-tubes without interfering with the passage of water from the water-tubes to the lower portion of the shell B.

H H are upright tubular stay-bolts which extend through the shell B and are open at their lower and upper ends for the upward passage of heated gases and other products of combustion. These stay-bolts H have exteriorly-threaded lower ends turned into correspondingly-threaded apertures in the lower wall of the shell B, while their upper portions extend through apertures in the upper wall of said shell and are fixed in position through the medium of jam-nuts *k l*, disposed above and below the upper wall, as shown. It will thus be seen that there is no liability of the stay-bolts being displaced while the generator is in use, and yet when it is necessary for any reason to remove one of the bolts and replace it with a new bolt the same may be readily accomplished without affecting the other bolts.

I is a dry plate arranged in the shell B and dividing the same into lower and upper chambers, the upper chamber being designed to contain dry and superheated steam, the water-level being in the lower chamber. The said dry plate is preferably secured between the meeting portions of the shell-sections and is provided with apertures *m* for the passage of the hollow stay-bolts H, the said apertures being larger than the stay-bolts in about the proportion shown, so as to permit

steam to pass from the lower water-chamber of the shell to the upper chamber thereof and assure the steam being superheated by the stay-bolts or fire-tubes before it enters the upper or dry chamber of the shell.

In the practical use of the generator it will be apparent that water supplied to the tube E will pass through the several coils thereof before it passes into the generator at the lower end of one of the water-tubes D thereof.

It will also be apparent that water will occupy the tubes D and G, as well as the lower chamber of the shell of the generator, and will circulate down through the tubes G and pass upwardly in the tubes D, with the result that the conversion of the water into steam will be materially accelerated. It will further be apparent that the steam contained in the lower chamber of the shell B will be superheated by the flames and heated gases passing upwardly through the stay-bolts H and will be further superheated by reason of it being brought into close contact with the stay-bolts H incident to its passage from the lower chamber of the shell to the upper or dry chamber thereof.

It will be gathered from the foregoing that notwithstanding the simplicity and compactness of my novel generator and the facility with which the said generator may be repaired when necessary the same is possessed of great capacity in proportion to its size and is therefore well adapted for use in motor-vehicles and interurban car service.

I claim—

1. A steam-generator having a shell comprising lower and upper sections provided with apertured lugs arranged directly on each other; the lower section being also provided with screw-tapped apertures in its bottom wall and the upper section being also provided with apertures in its top wall, in combination with brackets, bolts extending through and connecting the lugs of the shell-sections together and to the brackets, a dry-

plate secured in the shell between the sections thereof and having apertures, tubular stay-bolts extending through said apertures of the dry plate and open at their ends and having exteriorly-threaded lower ends occupying apertures in the bottom wall of the lower shell-section and also having exteriorly-threaded upper portions extending through the apertures in the top wall of the upper shell-section, jam-nuts mounted on said upper portions and disposed below and above the top wall of the upper shell-section, and water-tubes open at their upper ends and having their upper ends exteriorly threaded to engage threaded apertures in the bottom wall of the lower shell-section.

2. In a steam-generator, the combination of a jacket, leg-brackets resting inside the jacket and having inturned arms at their upper ends and outturned arms at their lower ends; the latter arms extending through the jacket and being designed to rest on supports, a shell arranged in the upper portion of the jacket and comprising sections having apertured lugs, bolts connecting the lugs of the shell-sections together and to the upper arms of the leg brackets, a dry plate secured between the shell-sections, fire-tubes extending through the shell and the dry plate and open at their lower and upper ends, water-tubes communicating with and depending from the shell, circulating-tubes arranged in the water-tubes and open at their lower and upper ends, and a water-tube connected at one end to the lower portion of one water-tube and having coils surrounding the several water-tubes.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

LOUIE G. BUGBEE.

Witnesses:

H. M. WITT,
LOREN BUGBEE.