

No. 761,130.

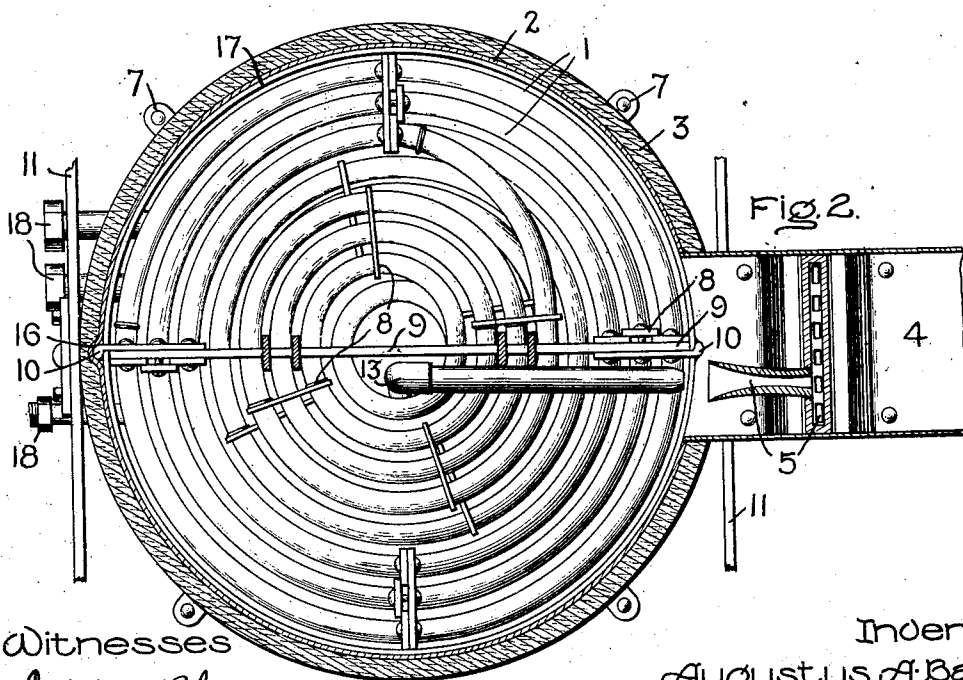
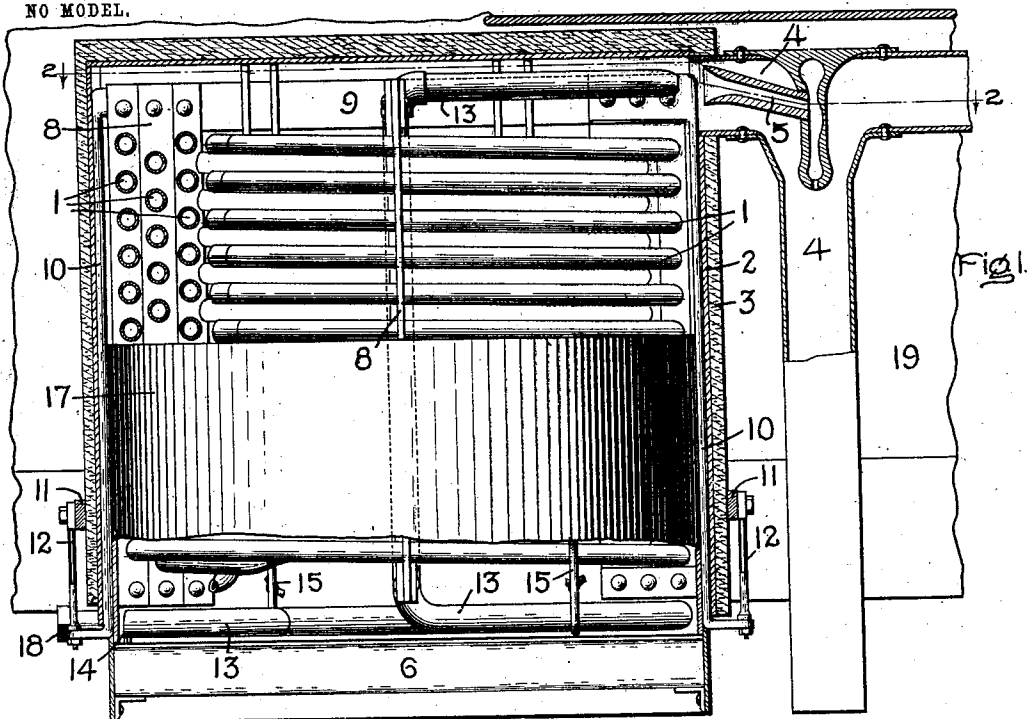
PATENTED MAY 31, 1904.

A. A. BALL, JR.

BOILER.

APPLICATION FILED AUG. 10, 1903.

NO MODEL.



Witnesses

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UNITED STATES PATENT OFFICE.

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MESNE ASSIGNMENTS, TO GENERAL ELECTRIC COMPANY, A CORPO-
RATION OF NEW YORK.

BOILER.

SPECIFICATION forming part of Letters Patent No. 761,130, dated May 31, 1904.

Application filed August 10, 1903. Serial No. 168,924. (No model.)

To all whom it may concern:

Be it known that I, AUGUSTUS A. BALL, JR., a citizen of the United States, residing at Lynn, county of Essex, State of Massachusetts, have
5 invented certain new and useful Improvements in Boilers, of which the following is a specification.

This invention relates to a water-tube boiler of the flasher type in which the coils are
10 supported in a manner that permits of their easy removal from the boiler-casing. For obvious reasons it is desirable to have the coils supported in the boiler-casing by a means which renders their removal an easy matter.
15 This is an important feature in an automobile steam plant, where accessibility to the boiler is highly desirable.

The object of my invention is to provide a simple and durable means for supporting the
20 coils in the boiler-casing and to arrange them so that they are accessible from points outside of the casing to facilitate the removal of the coils.

The several novel features of construction
25 and combination of parts will be hereinafter more fully described, and set forth in the claims.

In the accompanying drawings, which illustrate one embodiment of my invention, Figure
30 1 is a central vertical section of a boiler with portions thereof in elevation, and Fig. 2 is a top plan sectional view on line 2 2, Fig. 1.

In automobile construction it is common practice to arrange the boiler on suitable supports in the vehicle-body, and the boiler is
35 usually closed in, except at its bottom portion, which is left open to permit access to the burner and to afford draft to the boiler. This open space at the bottom of the boiler permits
40 of easy detachment of the burner, and, furthermore, the removal of the steam-generating coils when necessity demands.

Referring to the drawings, 1 is a nest of steam-generating coils of any desired character, and 2 the shell or casing of the boiler, the latter being jacketed with a suitable heat-non-conducting material 3, as asbestos. The casing
45 is preferably cylindrical and open at the

bottom. A double-draft flue 4 is arranged with branches for the natural and forced
50 drafts, and at the mouth of the flue a combined baffling and injecting device 5 is provided for creating the forced downdraft and preventing back draft from external currents of air.

In the bottom or open end of the casing is
55 detachably supported a hydrocarbon-burner 6. Any suitable means for supporting the burner may be employed; but, as shown, it is bolted to supporting-lugs 7 of the casing.

The boiler proper consists, preferably, of a
60 coil of pipe formed with numerous turns, which are secured rigidly in fixed relation by passing through plates 8. The pipe thus forms a single rigid nest, which can be readily placed in position in the casing or removed therefrom.
65 A cross-bar 9 is arranged diametrically over the coil and is riveted to two or more of the plates 8. Rigidly attached to the ends of the cross-bar are supporting members or standards 10. These standards are remov-
70 ably secured to supports exterior of the casing of the boiler. The supports, of which two or more may be used, serve as the sole means for sustaining the weight of the coil, and for this reason they must be secured in
75 fixed relation to the casing. The casing itself is secured to permanent supports 11, which are preferably suitable parts of the vehicle frame or body 19. The supports 11 also sustain the weight of the coil through the medium of the links or bolts 12. These latter
80 are secured to the supports 11 at their upper ends and at their lower ends to the standards 10, which extend laterally from the open end of the casing. By this arrangement the coil
85 is supported wholly independent of the casing of the boiler. This facilitates the removal of the coil without interfering with the casing or vehicle-body and relieves the shell of the weight of the coil.
90

Within the casing is a reheating-coil 13, which enters the boiler by passing through a recess 14 in the lower edge of the shell or casing adjacent the burner. This reheating-coil describes a few turns near the burner and
95 then passes as a riser at the axis of the main

coil to the top thereof, where it extends radi-
ally toward the exhaust or flue 4. The func-
tion of this coil is to receive the exhaust-steam,
either directly or indirectly, from the engine,
5 and by passing through the coil the steam
becomes reheated and is caused to issue into
the injection device in the flue, thereby cre-
ating a forced draft and practically an invis-
ible exhaust. The discharge end of the re-
10 heating-coil projects to a point in close prox-
imity to the flue and injecting device, but
sufficiently short of the same as to pass clear
of the shell or casing when the coil is re-
moved. The relative arrangements of the
15 discharge end of the pipe 13 and the inject-
ing device 5 are immaterial so long as they
can be separated without difficulty. The im-
portant thing is to be able to quickly sepa-
rate the parts when it is desired to remove
20 the boiler-coil from the casing. The reheat-
ing-coil is supported on the main coil by any
suitable means, as links or clips 15, and is
thus practically a part of the main coil in re-
spect to its being removable therewith.

25 The cylindrical shell or casing of the boiler
is provided with grooves 16, Fig. 2, in its in-
ner surface, and these receive the standards 10
and form guideways therefor to assist in re-
moving or inserting the coils. In the portion
30 of the boiler forming the combustion-chamber
a cylindrical lining 17 is provided to protect
the shell and the standards from the heat of
the fire. The lining is supported with the
main coil between the same and the standards
35 and is intended to be removable therewith.

In practice the coils are suitably connected
in the piping system leading to and from the
engine and the source of water-supply, and
40 couplings 18, located exterior of the casing,
facilitate connection and disconnection of the
coils of the boiler relatively to the piping sys-
tem. In order to remove the coils, obviously
the burner must be first removed. The pipe-
couplings 18 are then disconnected and next,
45 by removing the lower end nuts on the sus-
pension-bolts, the standards are free to disen-
gage from the bolts. As the suspension-bolts
are the sole supports for the coils, the coils
are free to drop out of the casing from the
50 bottom as soon as the nuts are removed.

From the foregoing it will be understood
that the coils, the cross-bar, the standards, and
the lining are supported and removed as one
structure. This is especially desirable, as it
55 greatly facilitates the repair or inspection of
the boiler, and as these members drop through
the bottom of the casing simply by detaching
the standards from the suspension-bolts it ob-
viates the usual necessity of disorganizing
60 much of the vehicle and its equipment.

In accordance with the provisions of the
patent statutes I have described the principle
of operation of my invention, together with the
apparatus, which I now consider to be the best

embodiment thereof; but I desire to have it 65
understood that the apparatus is only illustra-
tive and that the invention can be carried out
by other means.

What I claim as new, and desire to secure
by Letters Patent of the United States, is— 70

1. The combination of a coil of pipe, a cas-
ing therefor suitably supported, and means
independent and exterior of the casing for re-
movably supporting the coil.

2. The combination of a coil of pipe, an 75
open-bottom casing therefor supported in
fixed position, and means independent of the
casing and at the bottom thereof for remov-
ably supporting the coil.

3. The combination of a coil of pipe, a cas- 80
ing for the same open at its bottom, station-
ary supports for the casing, and means at-
tached to the stationary supports for remov-
ably supporting the coil in the casing.

4. The combination of a coil of pipe, a cas- 85
ing therefor open at its bottom and supported
independently of the coil, rigid members at-
tached to the coil and extending through the
bottom of the casing, and means in fixed po-
sition relatively to the casing for detachably 90
supporting said members.

5. The combination of a casing open at its
bottom, a coil of pipe, plates securing the
turns of the coil in fixed relation, a diametric-
ally-disposed cross-bar fixed to the top of the 95
coil, standards rigid at their upper ends with
the cross-bar and projecting exterior of the
casing at the bottom, permanent supports for
the casing, and suspension-bolts on the sup-
ports engaging the lower ends of the stand- 100
ards.

6. The combination of a casing open at the
bottom, a coil of pipe having its turns secured
in fixed relation, a cross-bar carrying the coil,
standards rigid at their upper ends with the 105
cross-bar and projecting laterally from the
open end of the casing at their lower ends,
grooves in the inner surface of the casing for
receiving the standards, a lining for the cas-
ing connected with the coil between the latter 110
and the standards, permanent supports for the
casing, and suspension means in fixed position
relatively to the casing removably connected
with the laterally-extending ends of the stand-
ards. 115

7. The combination of a casing open at the
bottom, a double-draft flue for the gases of
combustion, an exhaust-injecting device in the
flue for creating a forced draft, a removable
steam-generating coil supported independ- 120
ently of the casing, and an exhaust-reheating
coil secured on the steam-generating coil and
removable therewith, the discharge end of
the reheating-coil being disposed adjacent
said injecting device. 125

8. The combination of a vehicle-body, an
open-bottom boiler-casing rigidly supported
in the body, a steam-generating coil within

the casing, and means independent of and in permanent relation to the casing for removably supporting the coil.

5 9. In a boiler, the combination of a casing having an open end, a coil of pipe mounted therein and detachable through the open end, and a steam-carrying connection which has its continuity broken by the removal of the coil.

10 10. In a boiler, the combination of a casing having an open end, a coil of pipe mounted therein and detachable through the open end, a device for discharging the exhaust which is stationary with the casing, and a connection movable with the coil that movably dis-
15 charges into the said device.

11. In combination, a casing, a removable vaporizer-coil mounted therein, an exhaust-

discharging device, a reheater which is also mounted in the casing and is removable therefrom, and a connection which conveys vapor 20 from the reheater to the exhaust device and has its continuity interrupted by the removal of the reheater.

12. In combination, a casing, a down-flue therefor, and an exhaust-conduit therein, and 25 a reheater removably supported in the casing and disposed normally to have continuity with the exhaust-conduit.

In witness whereof I have hereunto set my hand this 7th day of August, 1903.

AUGUSTUS A. BALL, JR.

Witnesses:

DUGALD McK. McKILLOP,

CHATTIN BRADWAY.