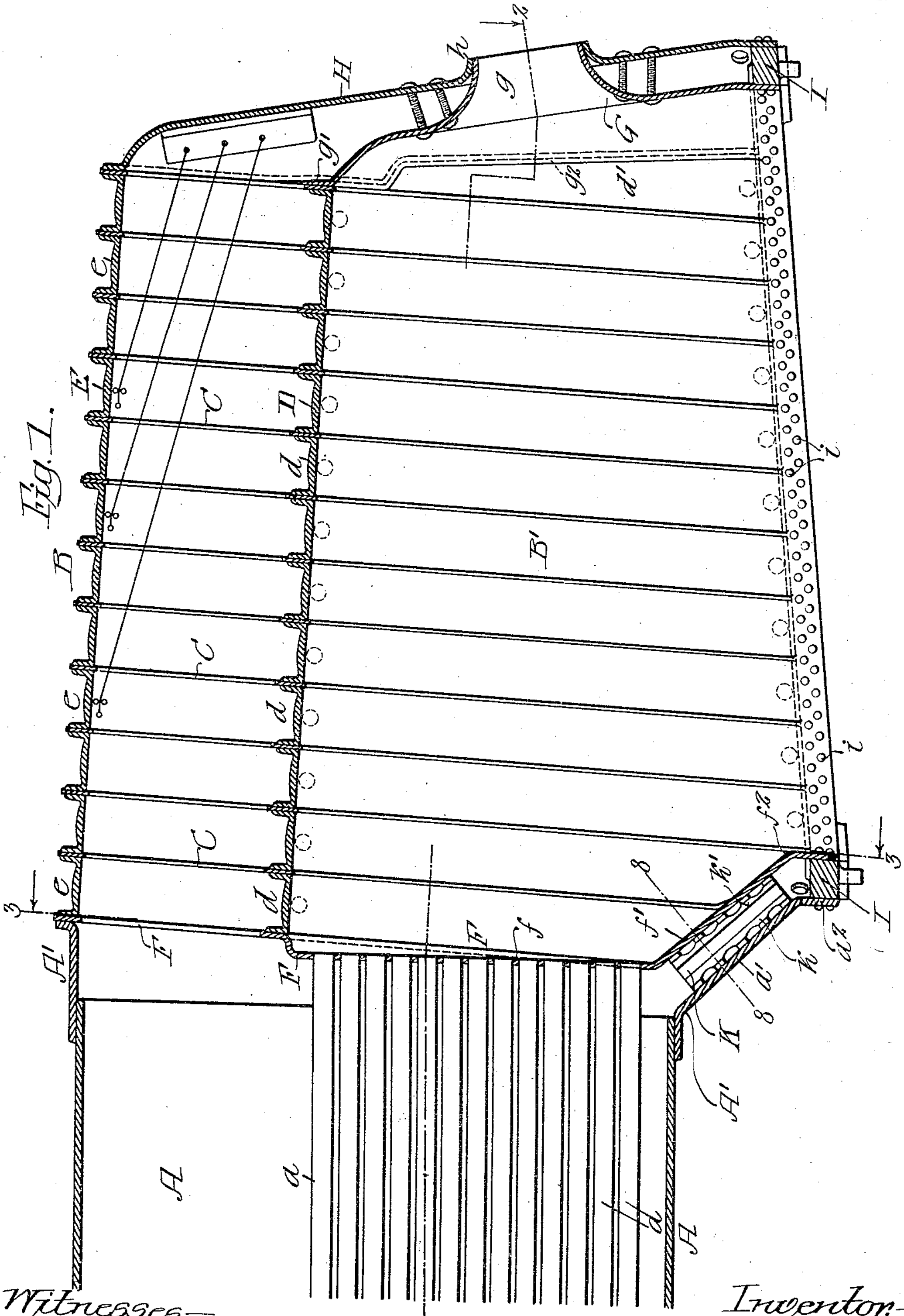
G. B. PHILLIPS.

LOCOMOTIVE BOILER.

APPLICATION FILED APR. 19, 1912.

1,067,674. Patented July 15, 1913.

4 SHEETS—SHEET 1.



Witnesses—
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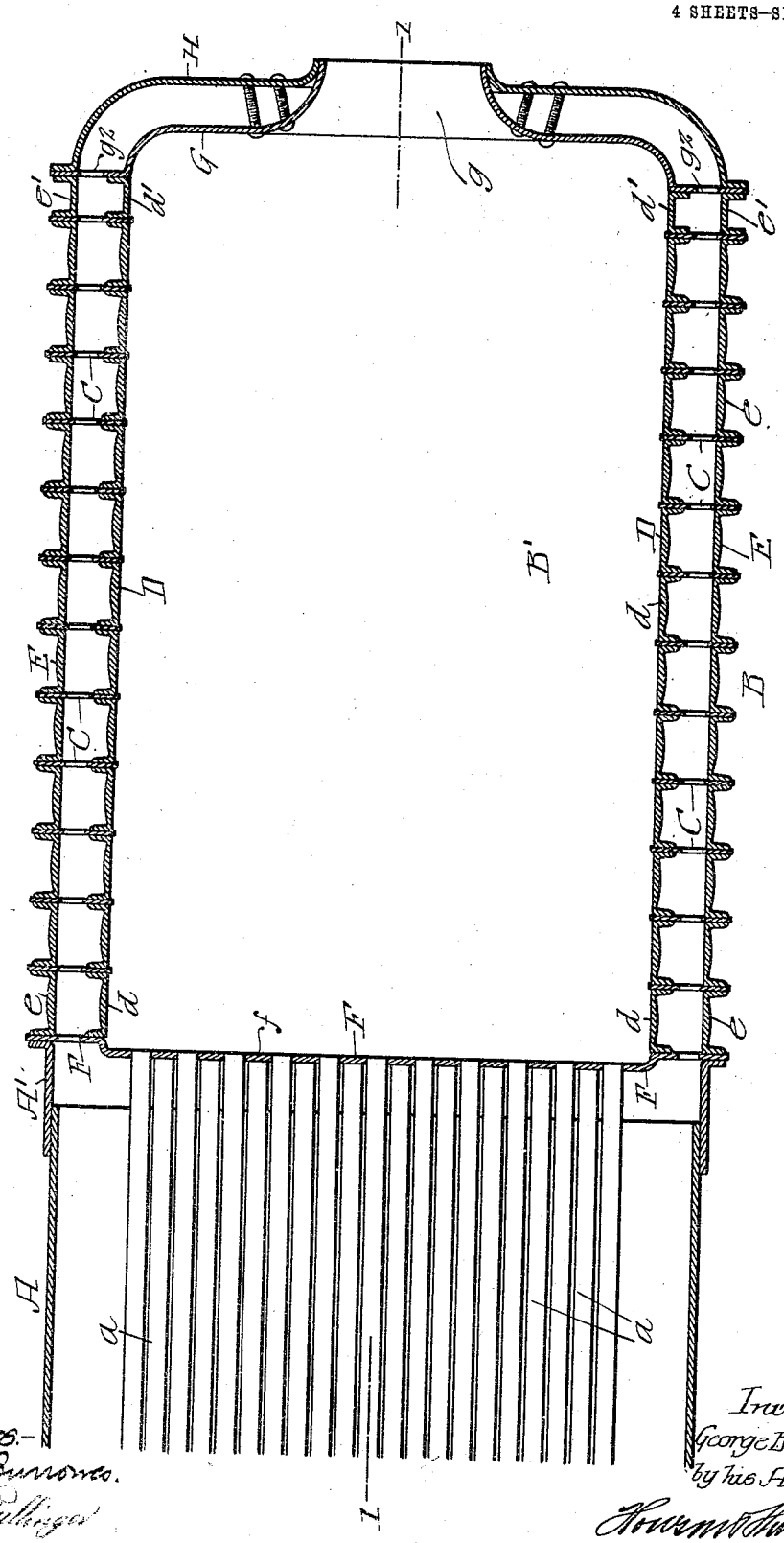
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4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

Fig. 5.

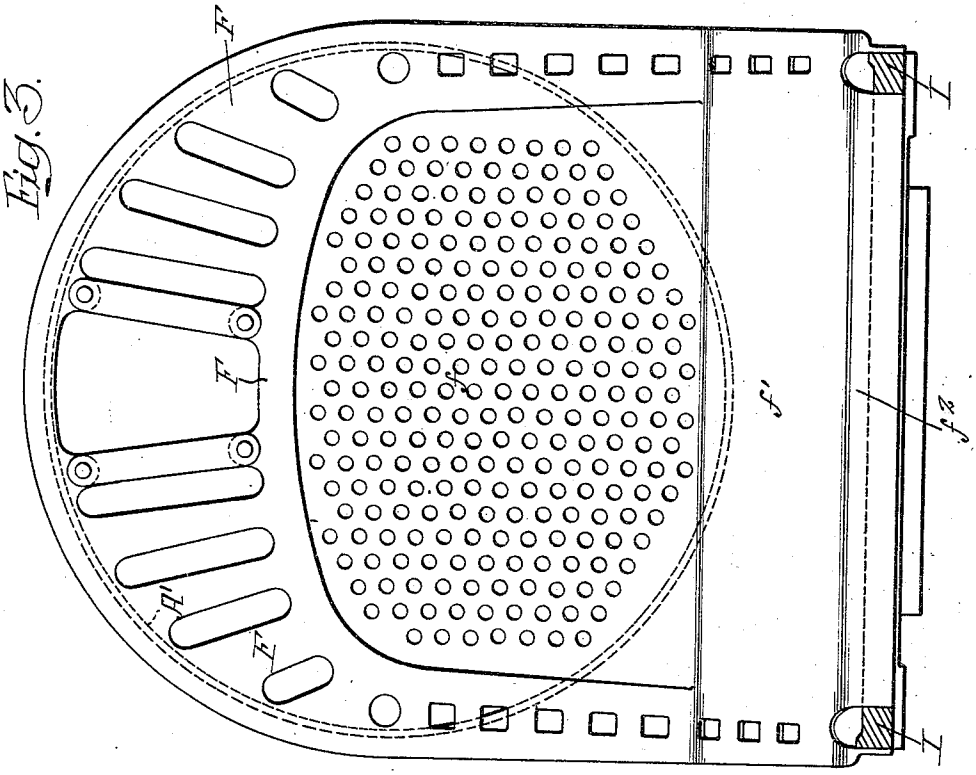


Fig. 6.

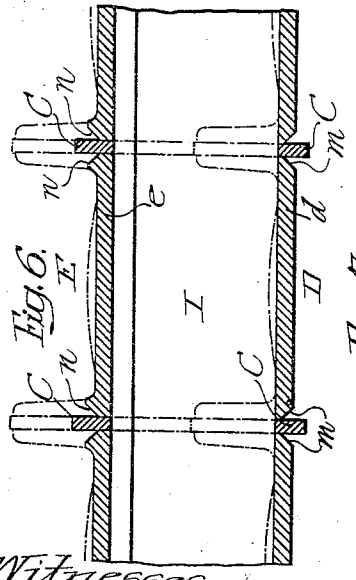


Fig. 7.

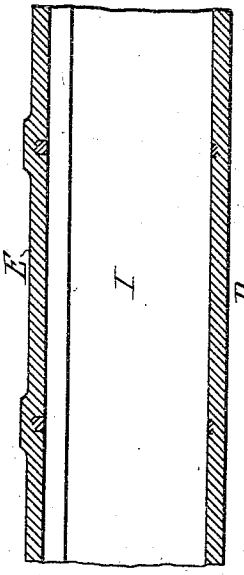
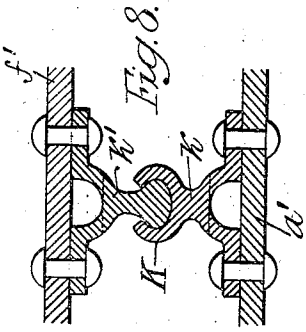


Fig. 8.



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4 SHEETS—SHEET 4.

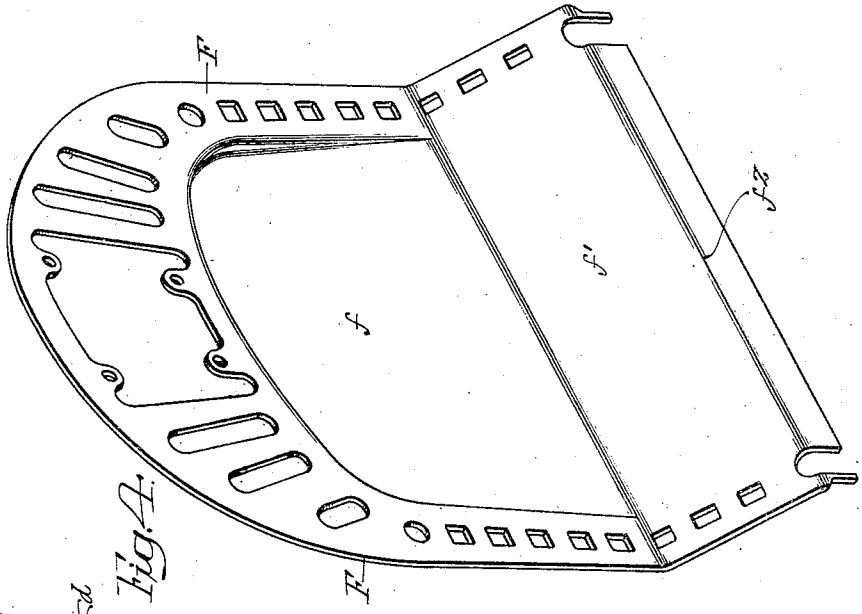


Fig. 4.

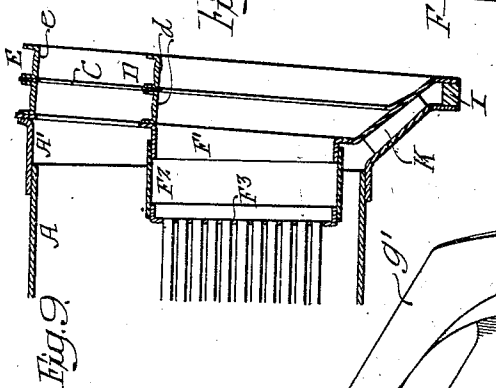


Fig. 9.

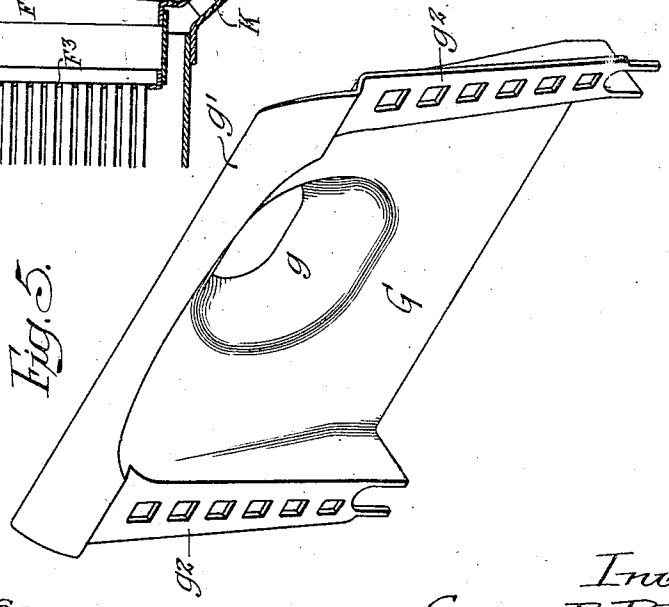


Fig. 5.

Witnesses.—
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UNITED STATES PATENT OFFICE.

GEORGE B. PHILLIPS, OF CHESTER, PENNSYLVANIA, ASSIGNOR TO THE BALDWIN LOCOMOTIVE WORKS, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

BEST AVAILABLE COPY

LOCOMOTIVE-BOILER.

1,067,674. Specification of Letters Patent. Patented July 15, 1913.

Application filed April 19, 1912. Serial No. 691,816.

To all whom it may concern:

Be it known that I, GEORGE B. PHILLIPS, a citizen of the United States, residing in Chester, county of Delaware, State of Pennsylvania, have invented certain Improvements in Locomotive-Boilers, of which the following is a specification.

My invention relates to certain improvements in the construction of locomotive boilers of a type having a series of channel sections forming the inner and outer walls of the fire box section of the boiler.

The main object of the invention is to apply the above construction to a sloping wagon top boiler.

The invention also relates to means for coupling the inner and outer sections to the mud ring and to further details of construction, which will be fully described hereinafter, reference being had to the accompanying drawings in which:—

Figure 1, is a longitudinal sectional view of the rear end of a locomotive boiler on the line 1—1, Fig. 2; showing the fire box construction; Fig. 2, is a view taken on the line 2—2, Fig. 1; Fig. 3, is a transverse sectional view on the line 3—3, Fig. 1; Fig. 4, is a detached perspective view of the rear tube sheet; Fig. 5, is a detached perspective view of the inside door sheet; Figs. 6 and 7, are enlarged plan views showing the method of connecting the sections at the mud drum; Fig. 8, is an enlarged sectional view on the line 8—8, Fig. 1; and Fig. 9, is a view of a modification.

Referring to the drawings, A is the shell of the boiler and *a* are the flues.

F is the rear tube sheet to which the flues are attached.

G is the inside door sheet and H is the outside door sheet, both inclined, as shown.

The top of the fire box section B of the boiler slopes toward the rear, as shown; the sections E and D forming respectively the inner and outer shell of the boiler at the fire box and canted so as to be at right angles to the inclined wagon top, as clearly shown in Fig. 1. The stay plates C are also arranged at an angle, as shown. The sections *e* of the outside casing E are made channel-shaped and have flanges which project outwardly and these flanges are secured by rivets to the stay plates, as shown. The inner casing D, which forms the shell of the fire box B′ is also made of channel sections with the flanges projecting outwardly and are secured by rivets to the stay plates C. Thus the interior of the fire box B′ has an even, unobstructed surface, while the flanges and rivets of the inside casing are projected into the water space and are protected, while the outside flanges project on the outside of the boiler.

By setting the sections *e* and *d* at right angles with the inclined line of the top of the fire section of the boiler, they will not be at right angles with the longitudinal tubes of the boiler. Therefore, I make the tube sheet F as clearly shown in Figs. 1 and 4. The portion *f* to which the tubes are secured is offset in respect to the balance of the tube sheet so that it will be at right angles to the line of the tubes. This not only allows for the ready fastening of the tubes to the tube sheet, but also materially strengthens the sheet. The lower end of the sheet is bent to project into the fire box, as shown at f^2, and is secured to the mud ring I, while the body of this tube sheet forms the forward stay sheet and is riveted to the section A′ of the main body casing A and to the first of the series of channel sections *e*, as well as being secured to the inner sections *d*; making a very substantial construction.

The lower portion *a′* of the boiler section A′ is shaped as shown in Fig. 1, and is bent at a^2 and secured to the mud ring I. The two parallel surfaces *a′* and *f′* are secured together by a coupling K, illustrated in Fig. 8, made in two parts *k*—*k′*. The part *k* is in the form of a socket and the part *k′* has an elongated head adapted to the socket. One of these parts is attached to the portion *a′* and the other is attached to the portion *f′*. Thus the two portions are prevented from spreading, yet are capable of longitudinal movement.

The channel sections *e* and *d*, which compose the main portion of the fire box structure are similar in shape and size until they reach the end of the boiler and at this point a shaped outer section *e′* and a shaped inner section *d′* are placed, as shown in Figs. 1 and 2, between the said sheet and the outside door sheets G and H respectively. The inside door sheet G is shaped as shown in Fig. 5, having a flanged opening *g* and a transverse, tapered flange *g′*; also a perforated web g^2 at each side, which is secured to both

the inner and the outer casings *d* and *e*. The outside door sheet H is flanged and is coupled to the loose stay sheet, as well as to the web *g'* of the inside door sheet. The stay bolts are used where necessary and stay rods extend from the outside door sheet H; being secured at different points to the outer casing; as shown by dotted lines in diagram, Fig. 1.

To simplify and perfect the coupling between the inner and outer sections and the mud ring, I reduce the flanges of the sections *e* of the outer casing E at the mud ring, as shown in Fig. 6, allowing the edges of the said sheets to extend beyond the reduced flanges and I also bevel the sections at *n* at each side so as to provide a V-shaped groove on each side of the projecting portion of the stay sheet C.

I weld the three parts together by any of the ordinary processes, forming a joint, as illustrated in Fig. 7. The flanges of the inside casing D are entirely cut away and the curved body portion reduced so that it will fit snugly against the mud ring I. Each section *d* is beveled at *m*—*m* at each side so as to form a V-shaped projecting stay plate C. These parts are also welded so as to produce a joint, as illustrated in Fig. 7. The plates are secured to the stay sheet by rivets or bolts *i*, as illustrated in Fig. 1. By this construction, I dispense with all lapping joints at the mud ring and also do away with calking at this point. All of the rivets pass through solid metal. When it is necessary to remove any one of the sections *e* or *d*, one section can be severed from another section by cutting the welded portion and removing the rivets.

In some instances, when it is desirable to extend the combustion chamber, a tubular section F^2 may be secured to an annular flange on the tube sheet F' and a tube plate F^3 secured to the section as in Fig. 9, thus the combustion chamber will extend into the body of the boiler beyond the fire box; facilitating combustion and providing an extended heating surface. This construction also protects the ends of the flue tubes from the fire.

I claim:

1. The combination in a wagon top boiler, of a shell; longitudinal tubes therein; a tube sheet to which said tubes are secured; a series of inner and outer channel sections and stay sheets connecting said sections, and forming the fire box section; said stay sheets being arranged at an angle to the line of the slope of the inclined top of the fire box section of the boiler, the rear tube sheet being arranged on the same line as the channel section and having the portion to which the tubes are attached offset so as to be at right angles with the longitudinal line of the tubes.

2. The combination of a longitudinal shell; a fire box section having an inclined upper surface; said shell having a section inclined at the rear edge and at right angles to the line of slope of the inclined surface of the fire box section; and a tube sheet located between the shell and the fire box section having an offset portion to receive the tubes, the fire box section consisting of a series of inner and outer channel sections; and stay sheets connecting the sections, the sections and the stay sheets being also arranged at right angles to the line of slope of the top of the fire box section.

3. The combination in a locomotive boiler, of the sloping wagon top type, of a body portion; tubes therein; a fire box section consisting of an inner and an outer casing; each made of channel sections and connecting stay sheets; said channel sections being arranged at right angles to the inclined line of the upper portion of the boiler; a rear tube sheet to which the flues are connected forming the front stay sheet of the boiler; an inside and an outside door section at the rear of the boiler and tapered so as to be inclined in a reverse direction to the inclination of the flanged sections and so shaped as to be coupled to the stay sections.

4. The combination in a locomotive boiler of the sloping wagon top type, of a body portion having flue tubes therein; a fire box section having an inner and an outer casing; said casings being made of channel sections and connecting stay sheets; a struck up flue sheet forming the forward end of the fire box to which the tubes of the boiler are connected; said flue sheet also forming the forward stay sheet and being connected to the inner and outer casings; that portion of the tube sheet to which the tubes are attached being pressed so as to be at right angles to the longitudinal line of the tubes; while the body portion of the inside and outside door sheets at the rear of the boiler are inclined in an opposite direction from that of the sections of the casings; and tapered filling sections located between the inside and the outside door sheets and the rear stay sheet.

5. The combination in a locomotive boiler of the sloping wagon top type, of a body portion; flue tubes therein; an inner and an outer casing forming the fire box section of the boiler; stay sheets connecting the two casings; the rear section of the body having an inclined portion; a mud ring to which the said section is attached; a rear tube sheet having an inclined portion adapted to the mud ring; with a coupling connecting the two sections so that while they are prevented from separating they can move longitudinally independently of each other.

6. The combination of a boiler having a fire box section; a mud ring; a casing

formed of a series of sections; stay sheets located between the sections; the sections being beveled at each side; the mud ring and the stay sheets projecting beyond the beveled portion so that upon reducing the projecting portion of the stay sheets by a welding flame, a welded joint is produced.

7. The combination of a fire box section consisting of an inner and outer casing, each made of channel sections; stay sheets located between each section and extending from one casing to the other; a mud ring located between the sections; the flanges of the sections of the outer casing being cut away and the sections being beveled at each side; while the flanges of the inner casing are cut away and the sections beveled on the side opposite to the flanges of the other section; the stay sheets projecting between the beveled portions and, when reduced by a welding flame, forming a welded joint at the mud ring; and means for securing the inner and outer casings to the mud ring.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

GEORGE B. PHILLIPS.

Witnesses:
Jos. H. Klein,
Wm. A. Barr.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."