

N<sup>o</sup> 3729



A.D. 1906

*Date of Application, 15th Feb., 1906*

*Complete Specification Left, 15th Aug., 1906—Accepted, 31st Jan., 1907*

**PROVISIONAL SPECIFICATION.**

**Improvements in Locomotive and Traction Engines.**

I, GEORGE HUGHES, Regent House, Lostock Park, Bolton-le-Moors, County of Lancaster, Mechanical Engineer do hereby declare the nature of this invention to be as follows:—

This invention relates to railway locomotives and other traction engines.

5 Hitherto the exhaust steam from these engines has been employed to create a draught in the firebox by passing it through a restricted blast pipe orifice placed in the smoke box.

This invention has for its object the more economical use of the steam in locomotive and traction engines, and is designed to provide a steam condensing locomotive either of simple expansion or compound principle, in conjunction with apparatus for inducing a draught through the fire box and tubes, and means for starting the engine when of compound type.

10 It consists essentially in constructing the engine with means for condensing the exhaust steam from the cylinders instead of passing it direct to the atmosphere, by either air or water cooling apparatus, and utilising the condensed steam for heating the boiler feed water or the cooling water as feed water for the boiler, and also with mechanism for inducing draught for the fire.

In carrying out the invention conduits are arranged for conveying the exhaust steam from the cylinders to a receptacle for either surface or jet condensing.

20 Where surface condensing apparatus is employed the steam receptacles will be constructed with a number of tubes, either plain or with suitable projections, grooves or indentations, to give the greatest amount of condensing surface. The cooling or condensing medium may be either the draught of cold air induced by the motion of the locomotive, or by the fan for producing the draught, or a combination of both, or by other and well known means of surface or jet condensation by means of cold water.

When water is used for condensing the steam the tender or tanks are fitted with means to cool the water for further condensing purposes. The condensed and heated water may be used for boiler feed purposes.

30 A fan for producing the draught is fixed in the smoke box or other suitable place, and by means of attachments, conduits or other arrangements the requisite air for combustion is forced or induced through the fire box and tubes to the chimney, instead of utilising the exhaust steam through the blast nozzle as hitherto employed, (this air may be either cold or heated). The fan when placed in the smoke box is so fitted as to be readily and easily removed to admit of access to the boiler tubes for the purpose of cleaning them. The fan may be driven by a high speed reciprocating engine steam turbine (direct or indirect coupled) an electric motor or from the axle or otherwise.

Dated this 14th day of February, 1906.

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J. OWDEN O'BRIEN,  
Successor to and late of W. P. Thompson & Co. of Manchester,  
Patent Agents.

[Price 8d.]



*Hughes's Improvements in Locomotive and Traction Engines.*

## COMPLETE SPECIFICATION.

## Improvements in Locomotive and Traction Engines.

I, GEORGE HUGHES, Regent House, Lostock Park, Bolton-le-Moors, County of Lancaster, Mechanical Engineer; do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to railway locomotives and other traction engines more particularly to locomotives either of simple expansion or compound principle, of the type provided with condensing apparatus in conjunction with apparatus for inducing a draught through the fire box and tubes. 5

It consists essentially in constructing a locomotive or traction engine with means for condensing the exhaust steam from the cylinders—instead of employ- 10 ing it to create a draught or passing it direct to the atmosphere—by either air or water cooling apparatus, and utilising the condensed steam for heating the boiler feed water or the cooling water as feed water for the boiler, and also with mechanism for inducing draught for the fire.

The invention will be fully described with reference to the accompanying 15 drawings forming part of the specification.

Fig. 1. Side elevation of locomotive showing the condenser in section.

Fig. 2. Plan of locomotive and condenser half in section.

Fig. 3. Longitudinal section through smoke box showing the fan for creating the necessary draught through the fire and tubes in running position. 20

Fig. 4. Transverse section through the smoke box showing fan in running position.

Fig. 5. Side elevation partly in section of tender showing arrangement of condenser tubes for dealing with surplus exhaust steam.

Fig. 6. Sectional plan of tender showing the arrangement of condenser pipes 25 for dealing with surplus exhaust steam.

The invention is applicable to any form of steam locomotive or traction engine either single acting or compound and burning either solid, liquid or gaseous fuel.

At either side of the boiler A of the engine or in any other convenient position a surface condenser B or a jet condenser is placed through which the exhaust 30 steam from the cylinders C is passed.

The condenser is preferably tubular with steam chambers B<sup>1</sup> B<sup>2</sup> top and bottom and steam tubes *b* connecting them. The tubes being either open to the atmosphere or encased in an air chamber or water tank such as described in the Specification of my subsequent Patent No. 18196 of 1906. (I do not claim 35 in this specification for the specific construction of condenser as that is fully described and claimed in Patent No. 18196 of 1906.)

Steam pipes D connect the cylinders C with the condenser B and conduct the steam to the chamber B<sup>1</sup> whence it flows through the tubes *b* to the chamber B<sup>2</sup>. From the chamber B<sup>2</sup> the steam and water of condensation flow into an auxiliary 40 tank or chamber B<sup>3</sup>, to which also is connected the feed water supply from the tender or main tanks by the pipe E controlled by a float valve, *e*.

The surplus uncondensed vapour passes by way of pipe F to the chamber F<sup>1</sup> carried in the tender or main tanks see Figs. 5 and 6. The pipe F is fitted with a flexible connection between engine and tender of ordinary construction. The 45 chamber F<sup>1</sup> is connected with another chamber F<sup>2</sup> by two groups of tubes *f* and the latter chamber is fitted with an outlet pipe *f*<sup>1</sup> which leads away any uncondensed steam to the atmosphere.

In place of a blast pipe to create the desired draught through the fire and

*Hughes's Improvements in Locomotive and Traction Engines.*

through the smoke tubes I employ a fan G (or other form of air propeller) placed either in the smoke box to induce a draught through the smoke tubes by suction or in front of the fire box or otherwise placed to force a draught through the fire and tubes.

5 The fan is preferably placed in the smoke box and attached to the smoke box door so that when the door is opened it is swung clear of the tubes as described in the Specification of my subsequent Patent 18090 of 1906. (I do not claim in this specification for this specific construction and arrangement of fan as that is described and claimed in my Patent 18090 of 1906.)

10 The air supply for the fire may be heated by enclosing the condenser tubes *b* and drawing the air supply past them and delivering it to a closed ashpit.

I am aware that locomotive and traction engines have been constructed with steam condensers and also that they have been provided with fans to induce a draught and also that it has been proposed to heat the air before reaching the  
15 fire box and I do not claim either of these *per se*.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A locomotive or traction engine of the type referred to constructed with  
20 tubular condensers placed at either side of the engine, an auxiliary tank connected therewith into which the feed water flows, and supplementary condenser pipes in the feed water tank substantially as described.

2. In a locomotive or traction engine the combination of a condenser to condense the exhaust steam an auxiliary tank connected therewith into which the  
25 feed water flows a fan to induce or force a draught through the fire box and smoke tubes and an air passage or chamber around the condenser tubes through which air to the fire passes to be heated substantially as described.

3. A locomotive engine having the several parts constructed and arranged in combination substantially as described.

30 Dated this 14th day of August, 1906.

J. OWDEN O'BRIEN,  
Successor to and late of W. P. Thompson & Co. of Manchester.  
Patent Agents.

[This Drawing is a reproduction of the Original on a reduced scale.]

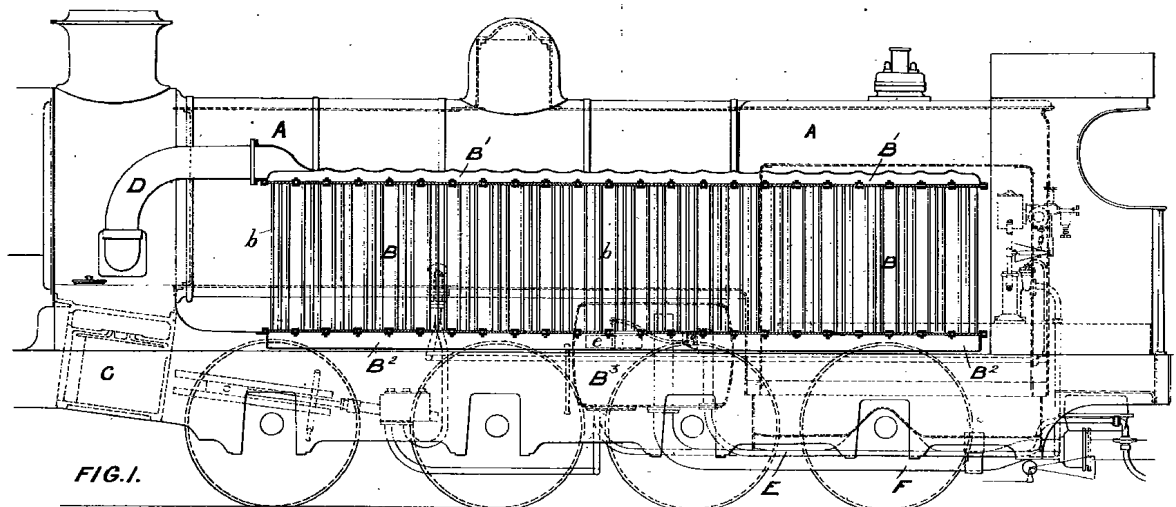


FIG. 1.

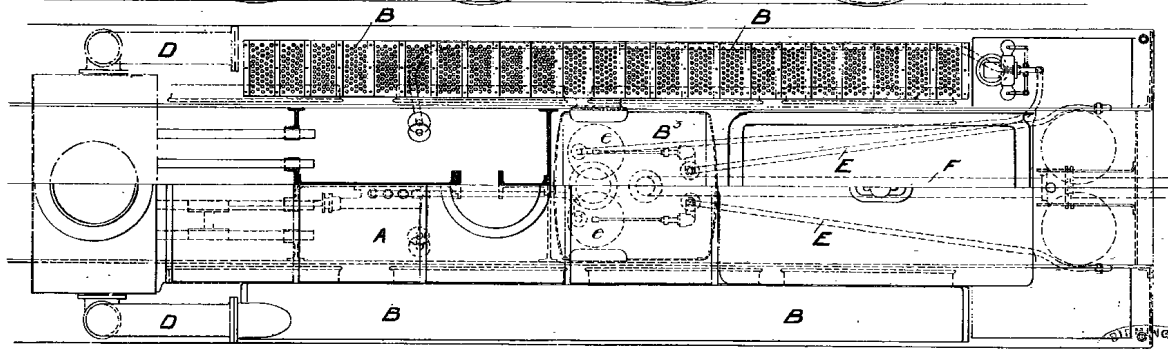


FIG. 2.

OLD ENGLAND  
FREE  
LIBRARY

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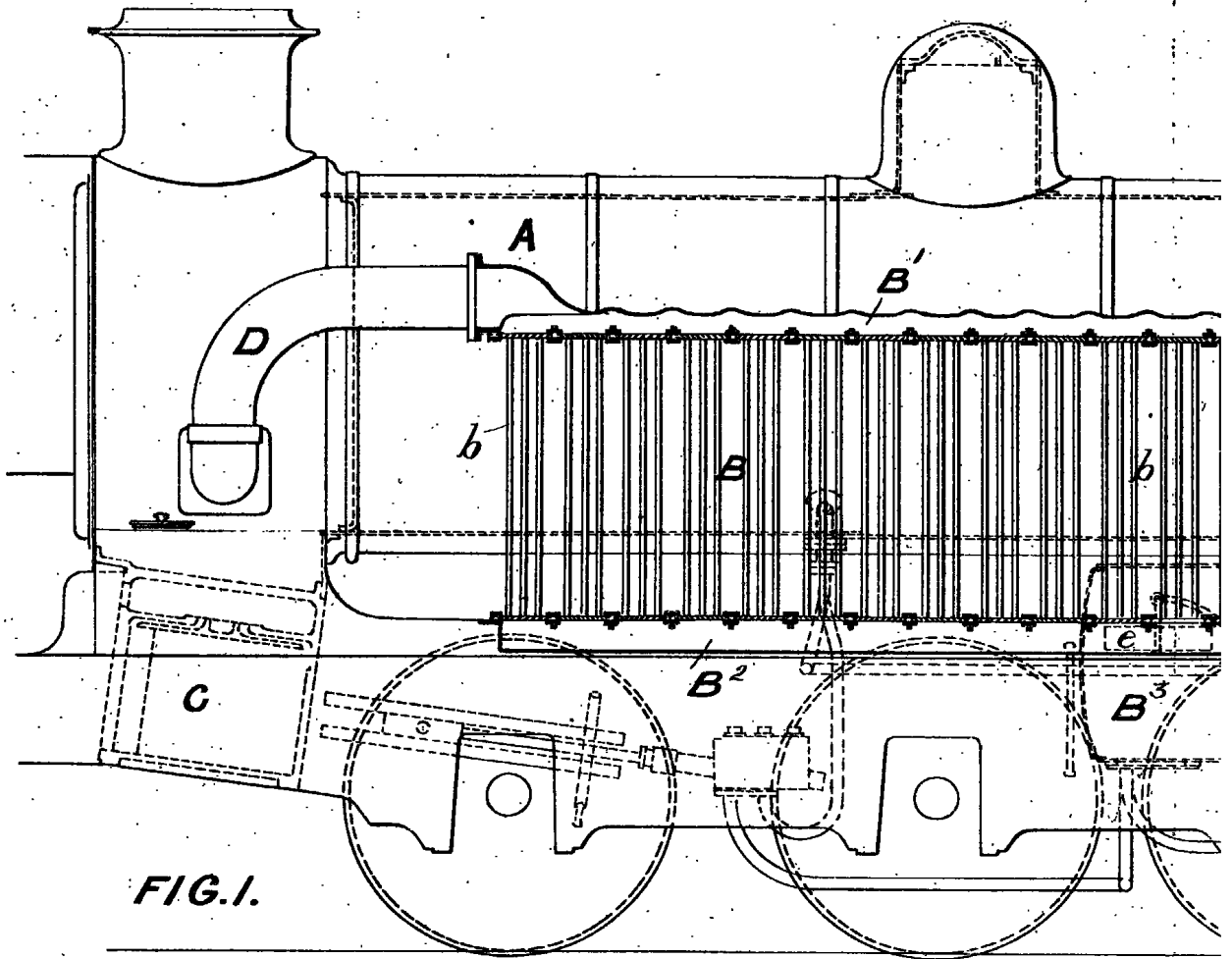


FIG. 1.

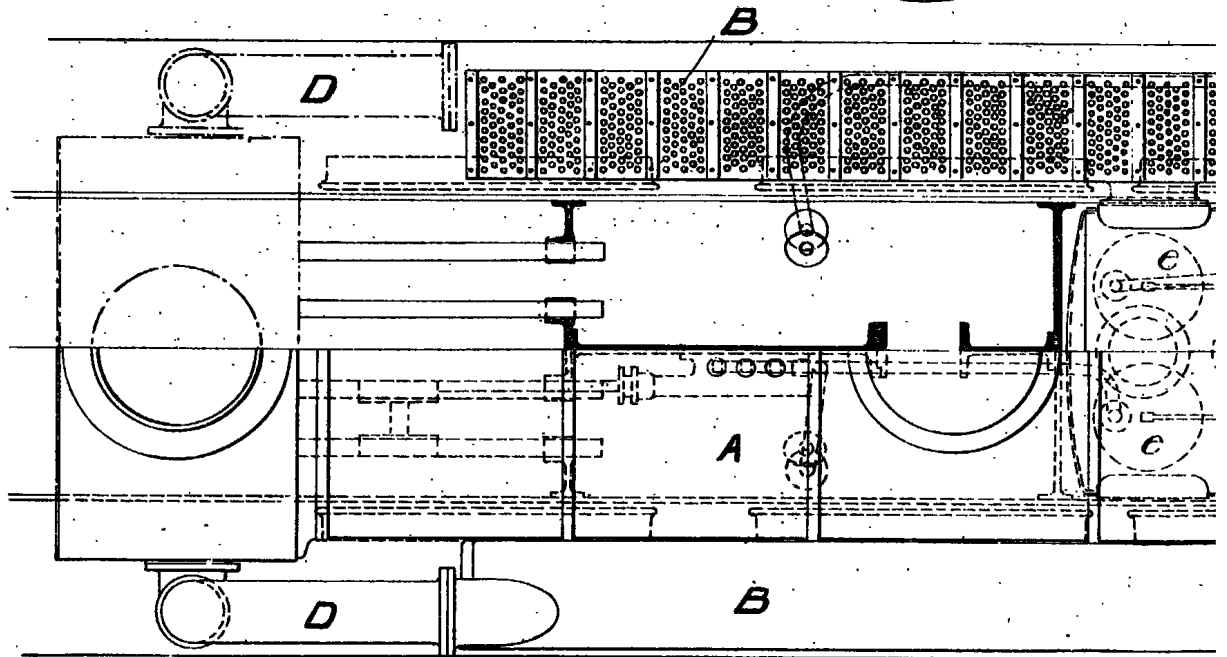
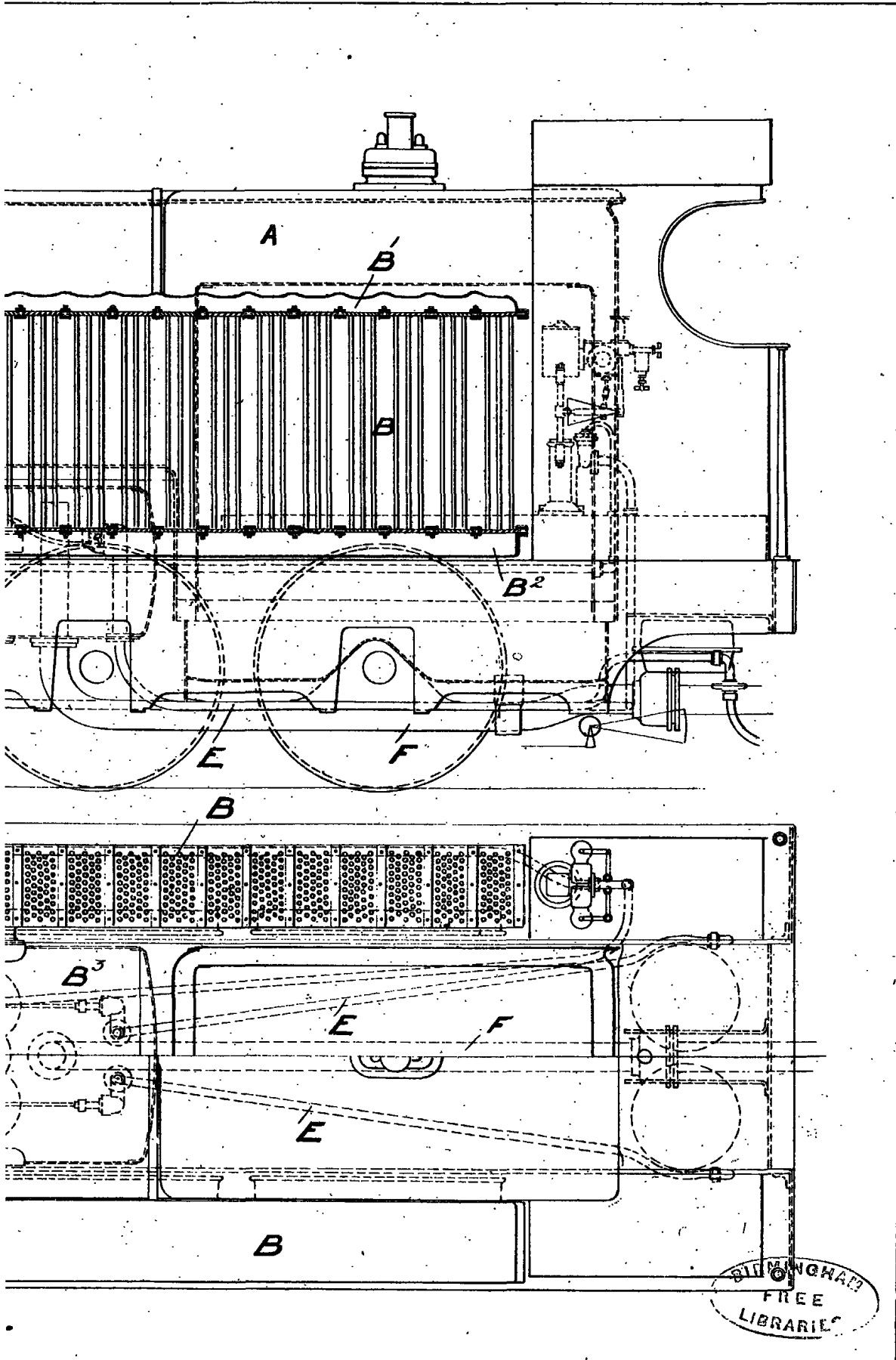


FIG. 2.



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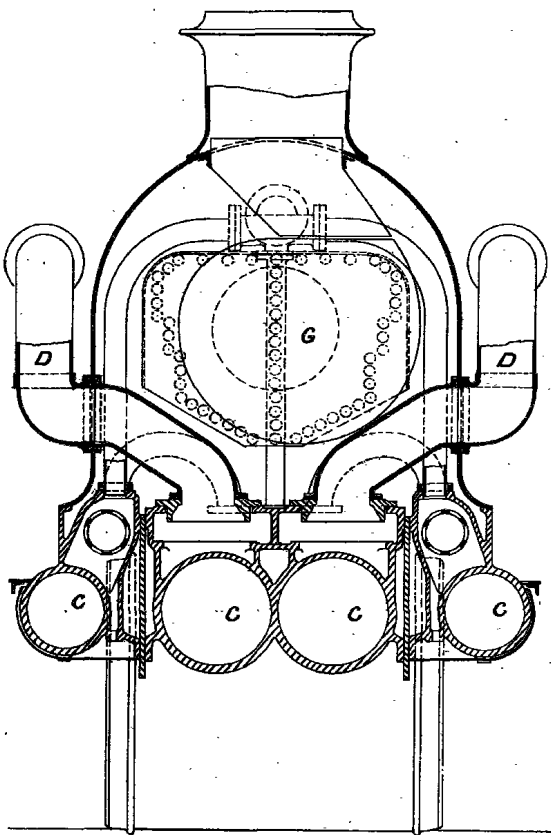


FIG. 4.

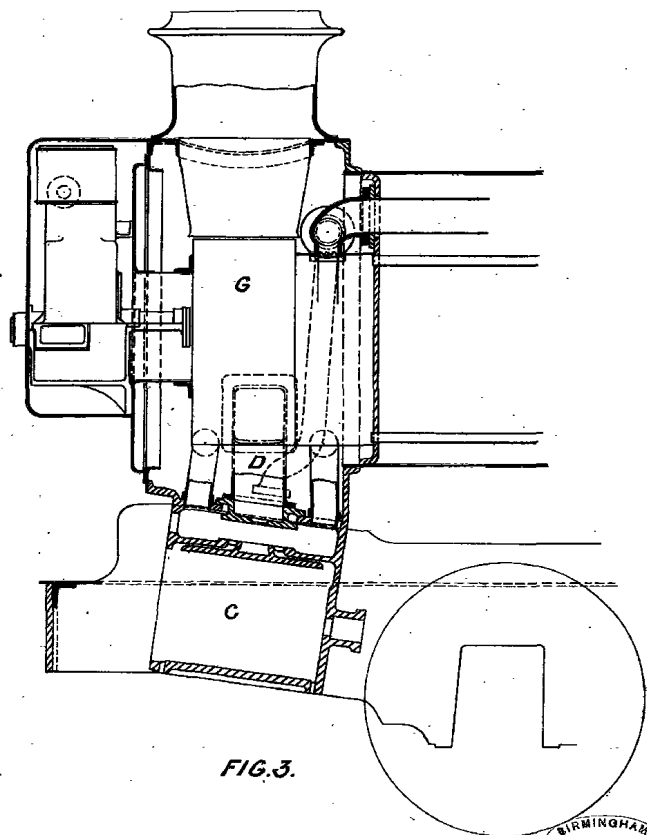


FIG. 3.

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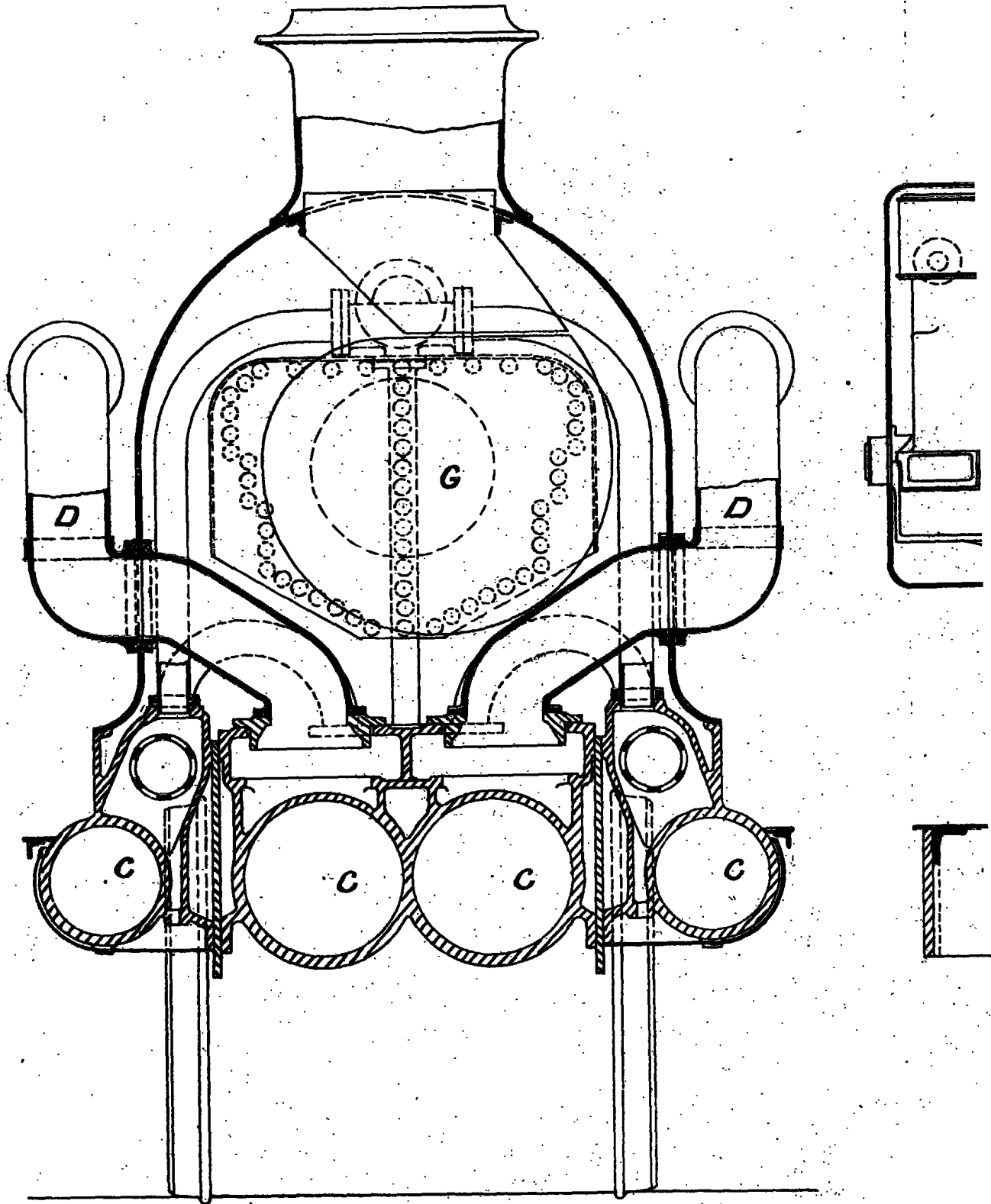


FIG. 4.



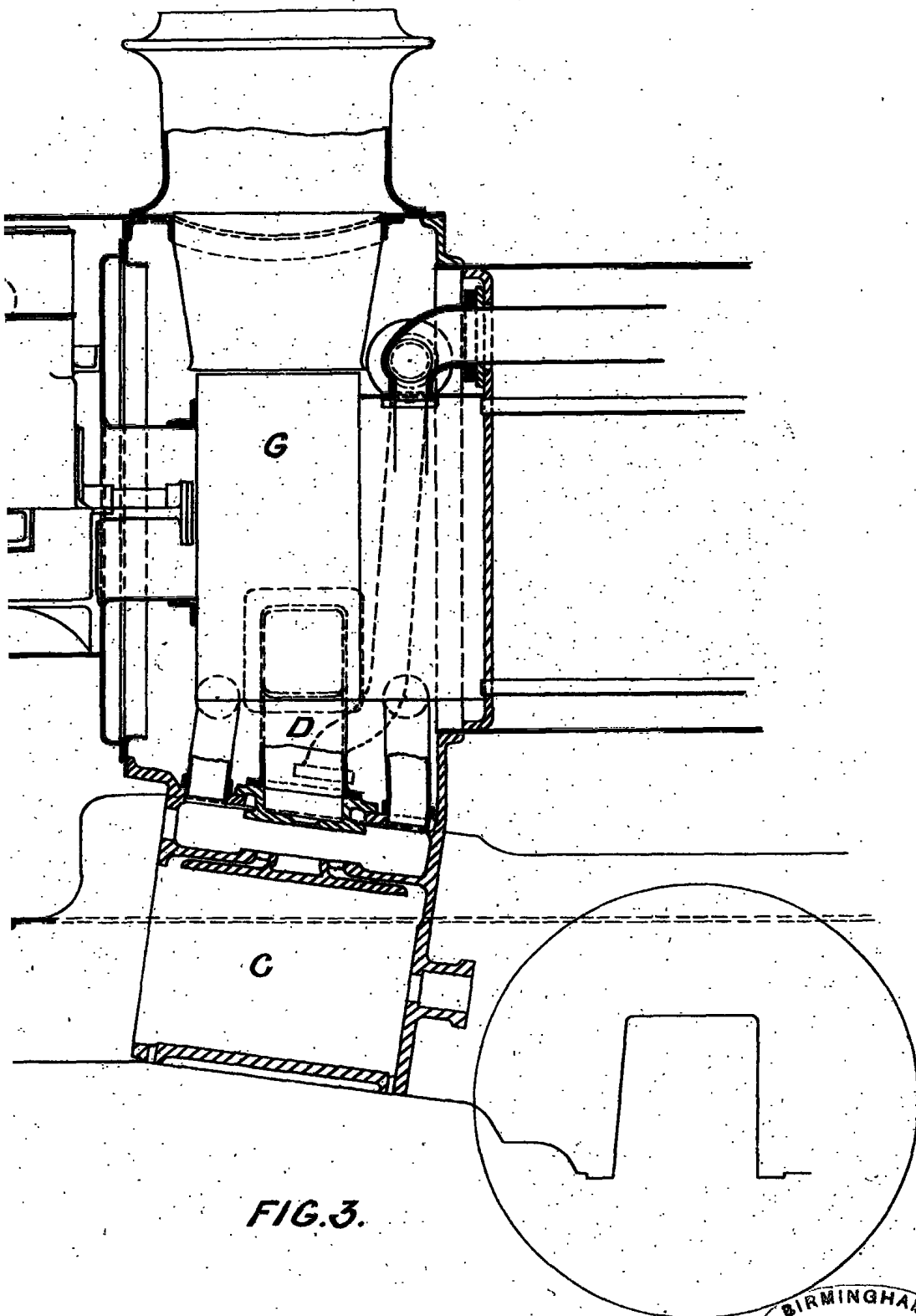
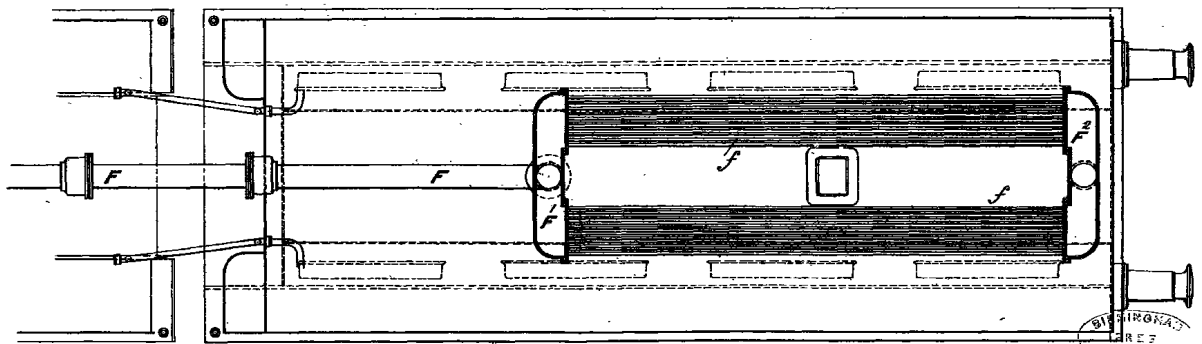
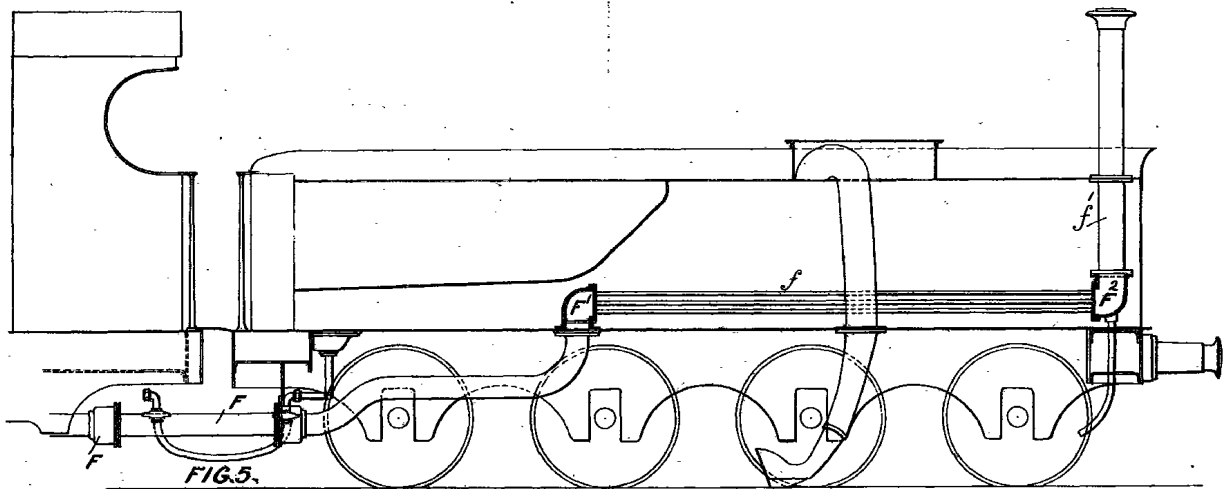


FIG. 3.

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FREE  
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BIRMINGHAM  
LONDON

Mellor & Sons, Photo-Litho.

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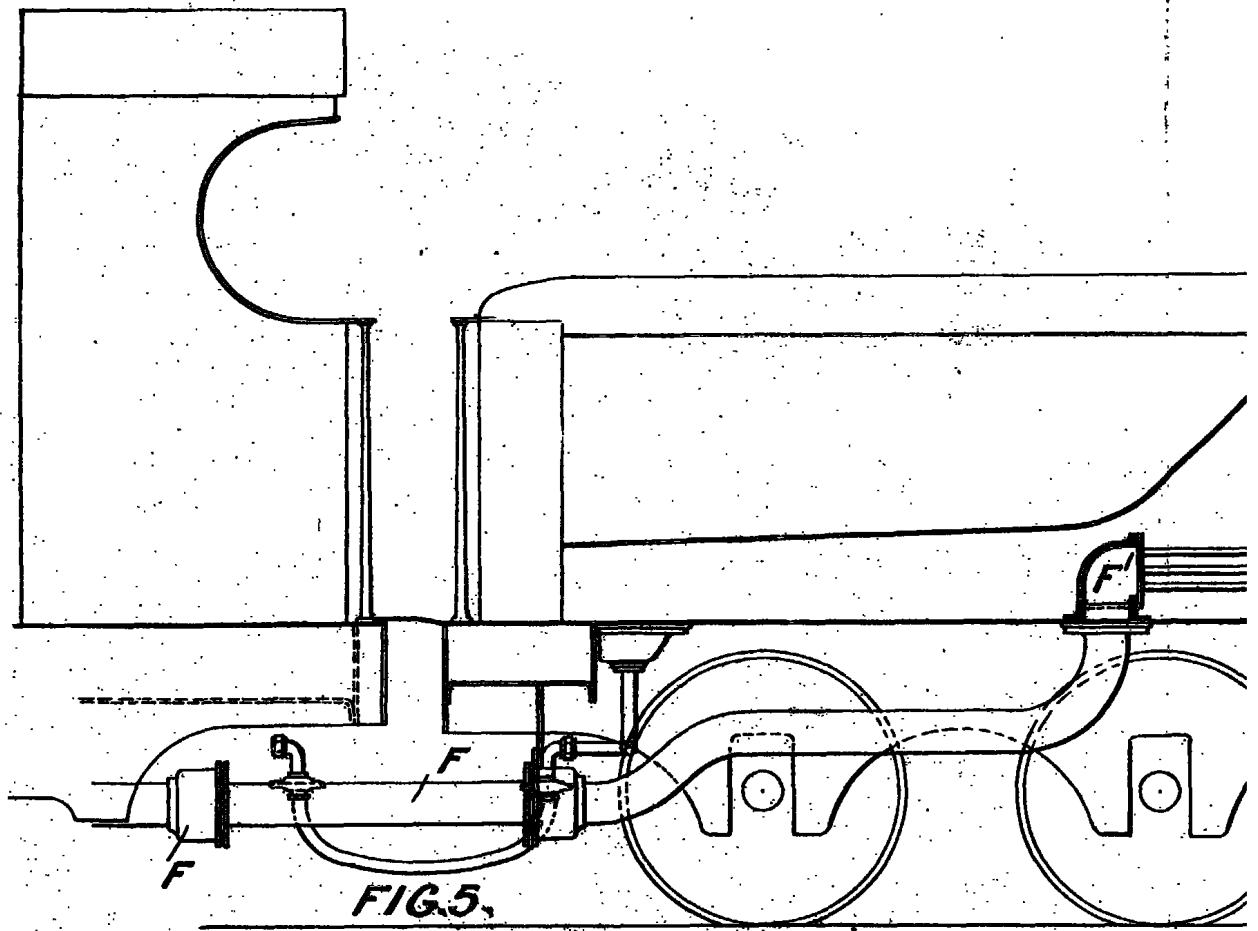
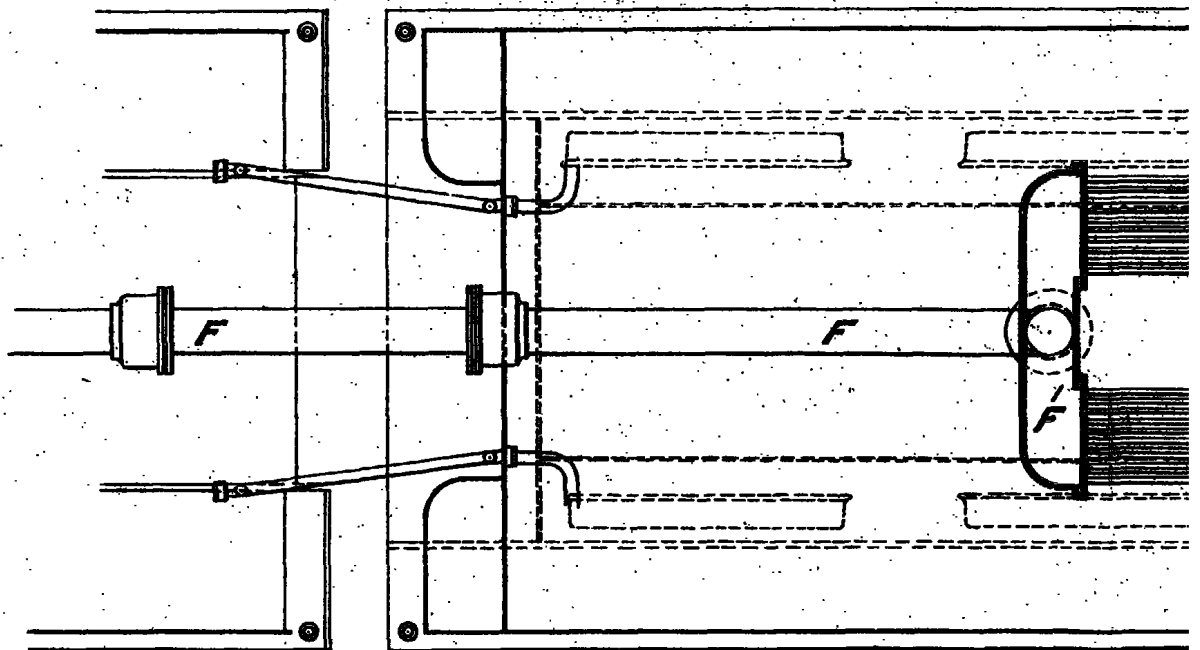
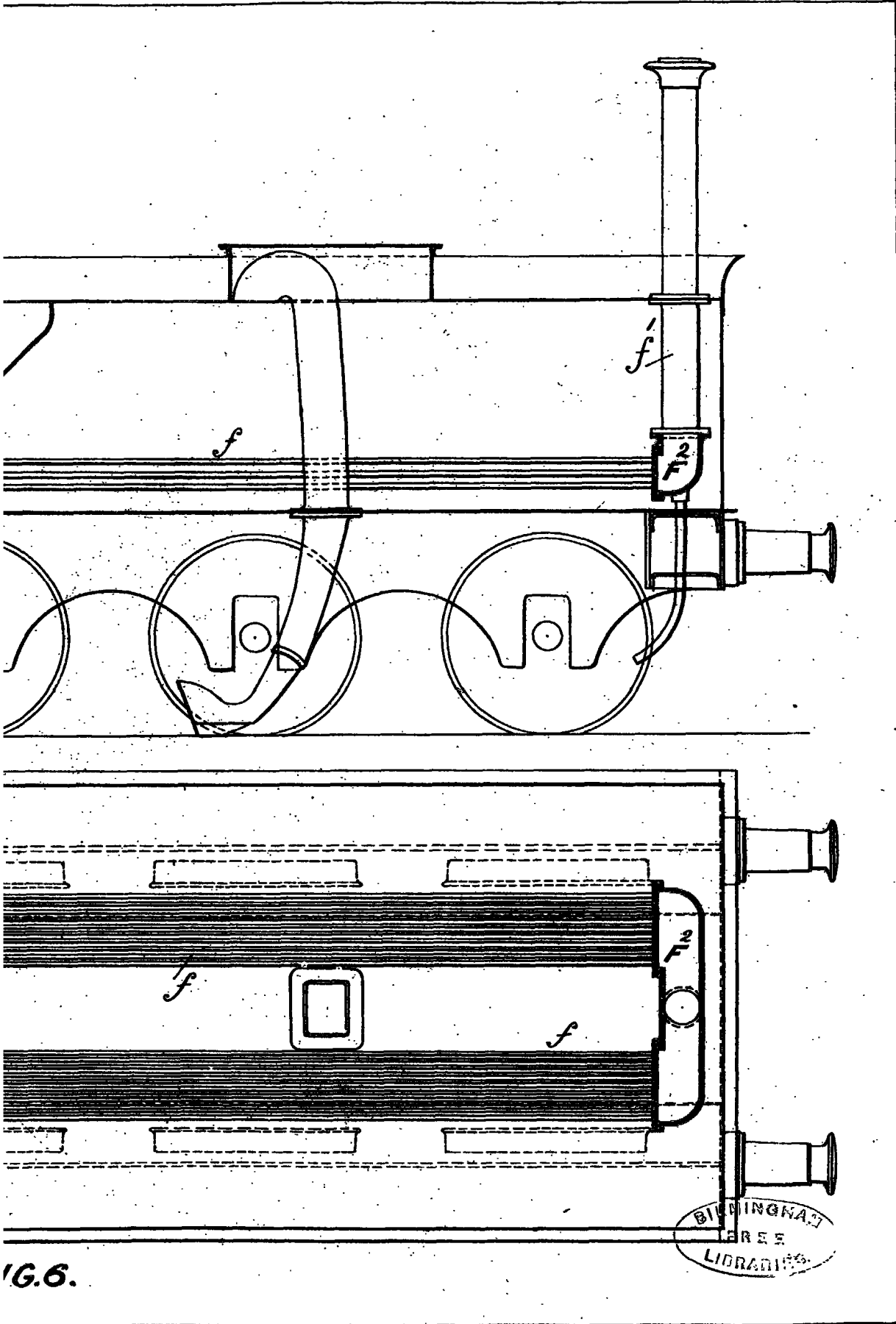


FIG. 5.



FIG



16.6.