

No. 715,279.

Patented Dec. 9, 1902.

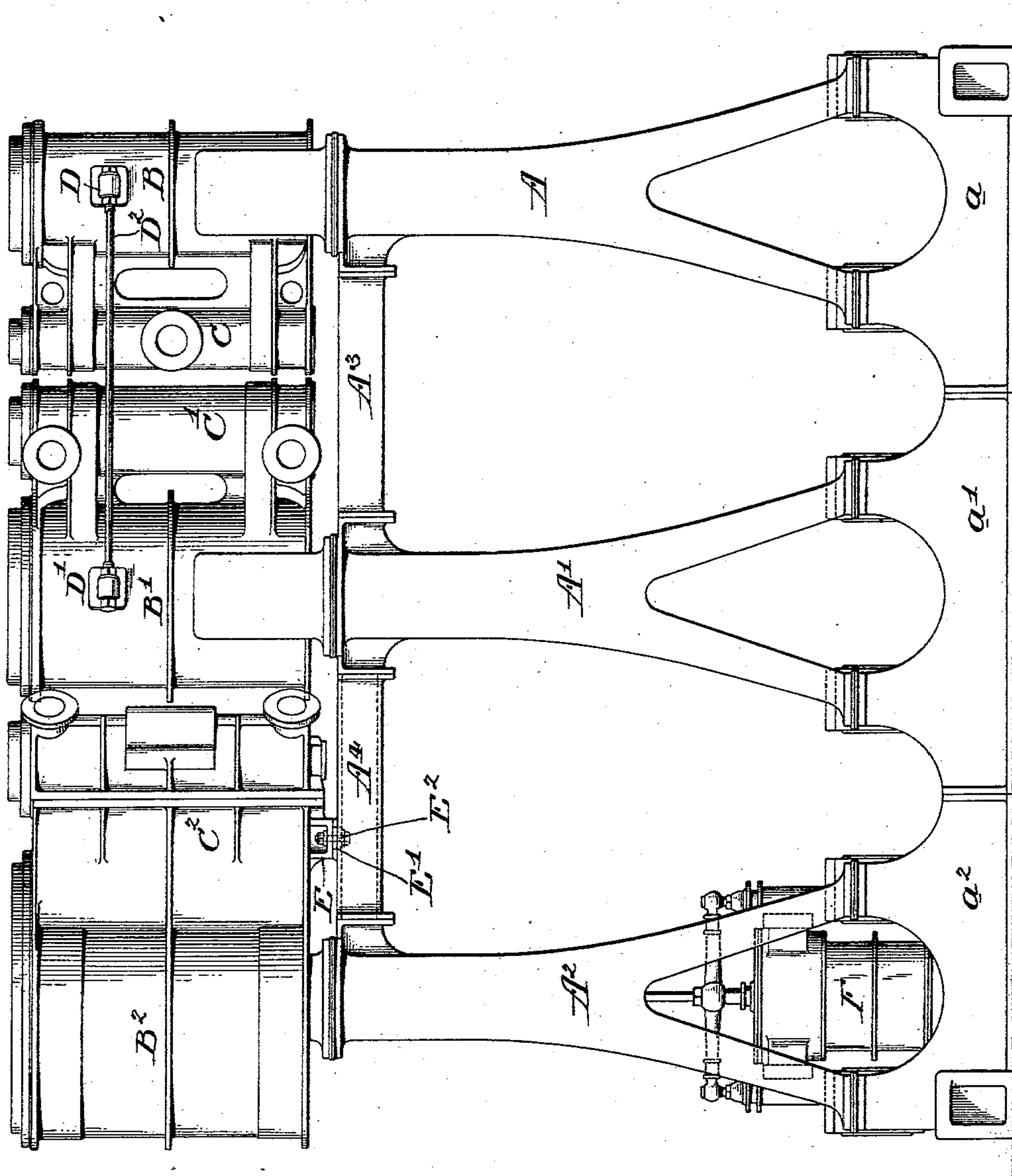
L. D. LOVEKIN.  
COMPOUND ENGINE STRUCTURE.

(Application filed Aug. 4, 1902.)

(No Model.)

3 Sheets—Sheet 1.

FIG. 1.



WITNESSES:

*H. W. Williams*  
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INVENTOR

*L. D. Lovekin.*

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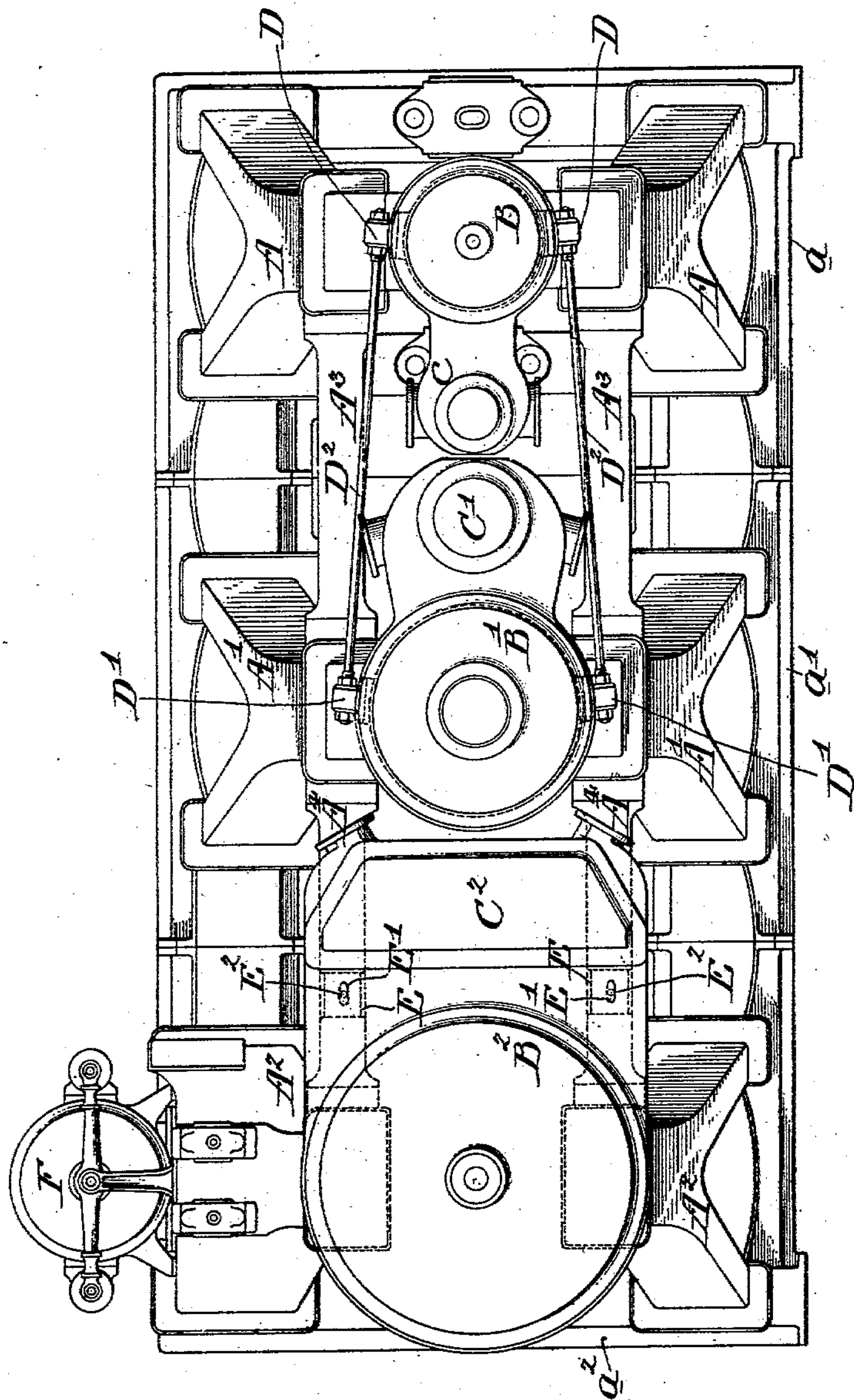
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FIG. 2.



WITNESSES:

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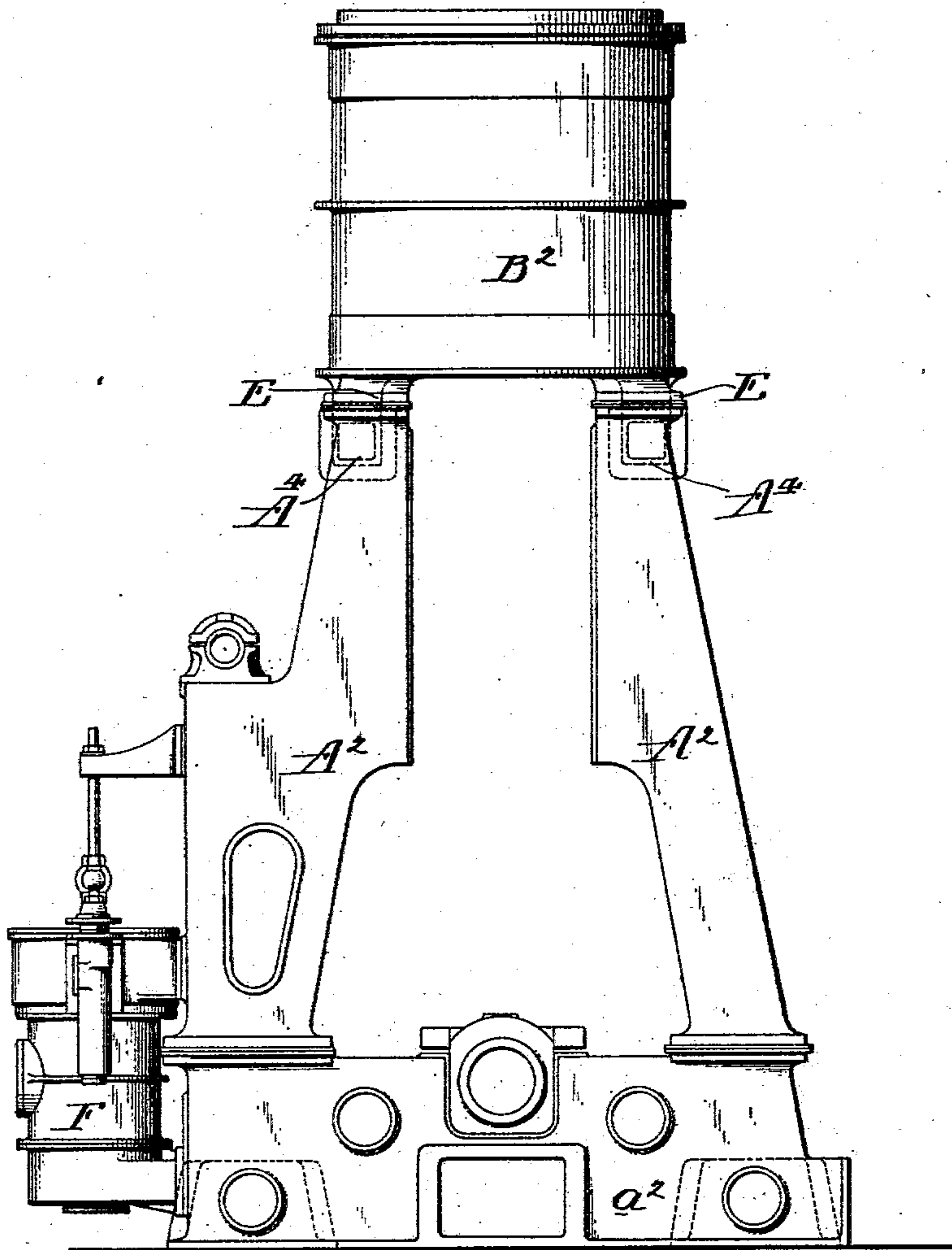
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3 Sheets—Sheet 3.

FIG. 3.



WITNESSES:

*Stewart*  
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# UNITED STATES PATENT OFFICE.

LUTHER D. LOVEKIN, OF ARDMORE, PENNSYLVANIA, ASSIGNOR TO NEW YORK SHIPBUILDING COMPANY, OF CAMDEN, NEW JERSEY, A CORPORATION OF NEW JERSEY.

## COMPOUND-ENGINE STRUCTURE.

SPECIFICATION forming part of Letters Patent No. 715,279, dated December 9, 1902.

Application filed August 4, 1902. Serial No. 118,207. (No model.)

*To all whom it may concern:*

Be it known that I, LUTHER D. LOVEKIN, a citizen of the United States of America, residing in Ardmore, in the county of Montgomery, in the State of Pennsylvania, have invented certain new and useful Improvements in Compound-Engine Structures, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My invention relates to the construction of vertical compound engines, such as are commonly used in connection with steamships, and has for its object to provide simple and efficient constructive features whereby the weights of the cylinders and valve-chests are supported and all tendency of the parts to get out of alinement by reason of being unsupported tending to tip the cylinders and attachments avoided.

The nature of my improvements will be best understood as described in connection with the drawings, in which I have illustrated my improvements as applied to a three-cylinder compound engine, though it will be at once understood that my invention is applicable in its broader feature to two-cylinder compound engines and in its narrower phase to multiple-cylinder compound engines embodying any number of cylinders.

In the drawings, Figure 1 is a side elevation of the engine; Fig. 2, a plan view, and Fig. 3 an end view showing the low-pressure cylinder.

A, A', and A<sup>2</sup> are the housings, resting upon the bed-plates (indicated at *a*, *a'*, and *a*<sup>2</sup>) and supporting, respectively, the high-pressure cylinder, (indicated at B,) the intermediate cylinder B', and the low-pressure cylinder B<sup>2</sup>, these cylinders being of course directly and centrally supported on the housings.

A<sup>3</sup> A<sup>3</sup> and A<sup>4</sup> A<sup>4</sup> are girders connecting the tops of adjacent housings.

C, C', and C<sup>2</sup> are respectively the valve-chests of the high, intermediate, and low pressure cylinders. These valve-chests are, as usual, supported from the sides of the vertical cylinders, and their weight, which is very considerable, as is also that of parts de-

pendent thereon, exerts a very considerable tipping strain upon the cylinders, which in ordinary constructions has been found at times to so shift the position of the cylinders as to destroy the alinement thereof and of the parts working in the cylinders and valve-chests. In the case of the heavy valve-box secured to the low-pressure cylinders and indicated at C<sup>2</sup>, I have provided beneath the valve-box supports (indicated at E E) which rest upon the girders A<sup>4</sup> A<sup>4</sup> and are free to move by a sliding motion thereon. These supports I have shown as formed with slots, (indicated at E<sup>2</sup> E<sup>2</sup>,) through which pass bolts E<sup>3</sup> E<sup>3</sup>, secured in the girders A<sup>4</sup>. This or, in fact, any other device by which the support is at once supported and free to move upon the girders may be used at will, and it is obvious that by this construction the heavy laterally-projecting valve-box is independently supported on the housings and by the simplest and most attractive means, whereby any tendency to tip the cylinder out of alinement is obviated. In the case of the comparatively small valve-chests (indicated at C and C' and secured to the high-pressure and adjacent intermediate cylinders) it is not so important that the weight thereof should be directly supported on the girders connecting the tops of the housings, nor is it so convenient to so support these valve-casings, as they are not broad enough to extend out over the girders. It is, however, important that the cylinders should be protected against the tendency of these laterally-projecting valve-chests to tip them out of alinement, and I therefore provide the construction indicated, making the valve-chests of the high and intermediate cylinders extend out toward each other and connecting the upper ends of the cylinders by struts D<sup>2</sup>, connected with the lateral sides of the cylinders B and B', as indicated at D and D'. These points of connection, it will be seen, have no tendency to vary their distance from each other with the expansion and contraction of the cylinders, and therefore the struts have no tendency to vary the alinement of the cylinders, while by tying the cylinders together near their tops they combine the cyl-



inders in what is, in effect, a truss well adapted to support the weight of the overhanging valve-chests C and C'.

I have shown at F in the drawings an air-pump secured on the base-plate and housing; but this forms no part of my present invention, being shown simply as a part of the practical structure to which my present invention is applied.

10 Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a compound steam-engine, the combination of vertical high and low pressure cylinders each supported on vertical housings, with girders connecting the housings at their tops, a valve-chest extending out from the low-pressure cylinder over the girders and sliding supports whereby the weight of said valve-chest is supported on the girders.

2. In a multiple compound steam-engine, the combination of a series of vertical cylinders each supported on vertical housings with girders connecting the housings at their tops, valve-chests for the high-pressure and adjacent intermediate cylinder projecting outward toward each other, struts connected to the front and rear of high-pressure and intermediate cylinders near their upper ends and whereby the cylinders are supported against tipping strains due to the weight of the valve-chests, a valve-chest for the low-pressure cylinder projecting over the girders connecting its housing with one adjacent and sliding supports whereby the weight of said valve-chest is supported on said girders.

LUTHER D. LOVEKIN.

Witnesses:

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E. GALL.