

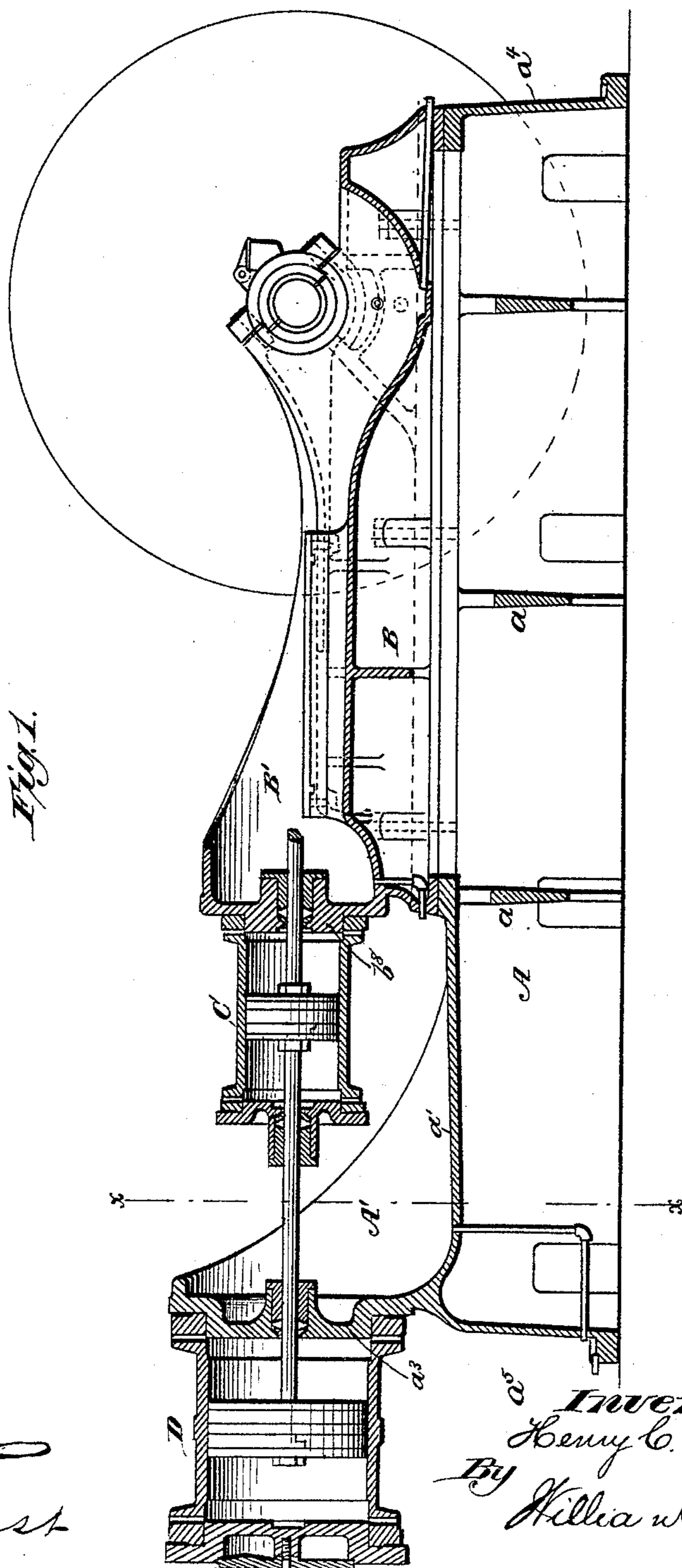
(No Model.)

3 Sheets—Sheet 1.

H. C. WHITE.
BED PLATE FOR STEAM ENGINES.

No. 440,674.

Patented Nov. 18, 1890.



Witnesses:

Wm. H. Brown

Wm. M. Ernst

Inventor:
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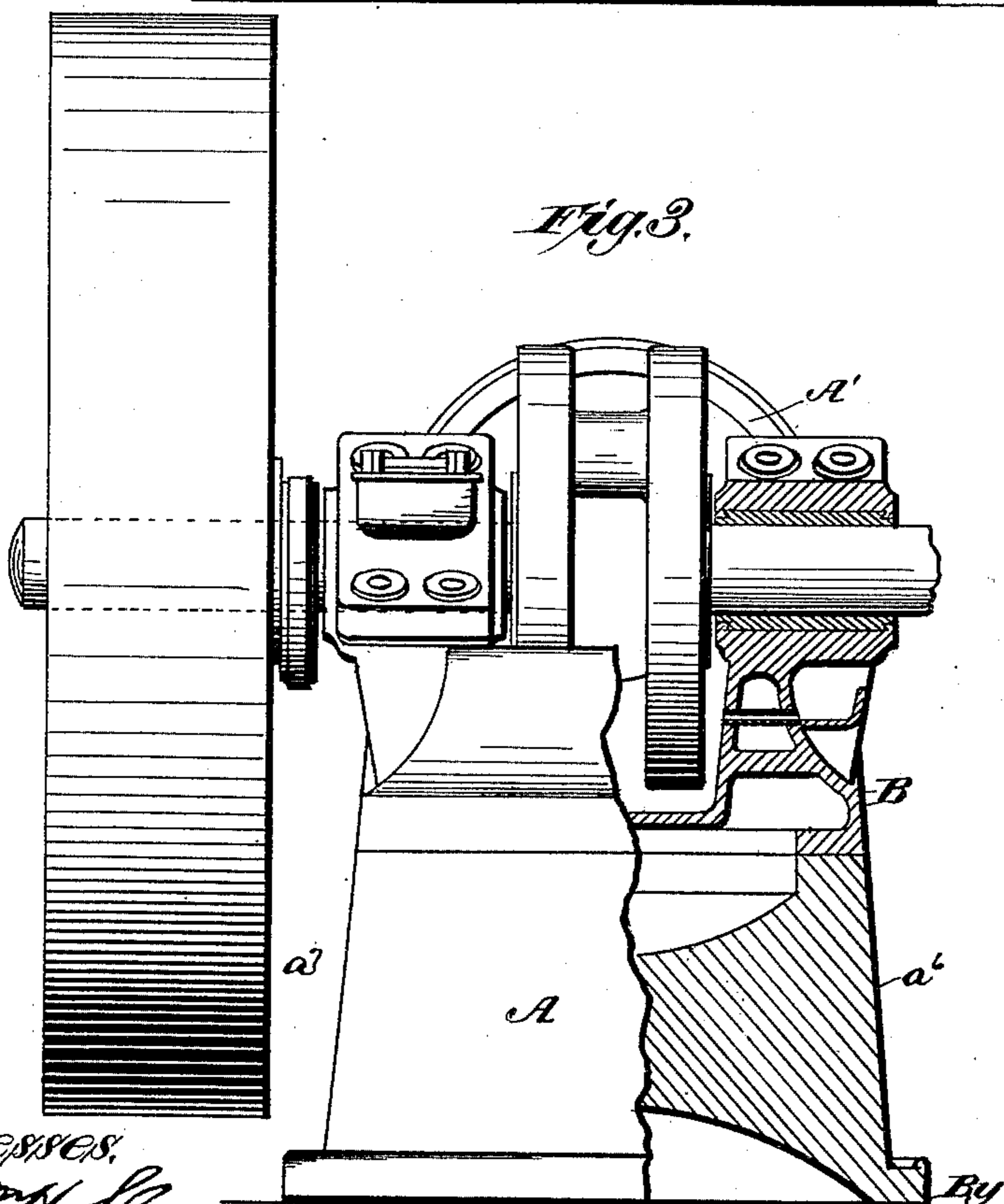
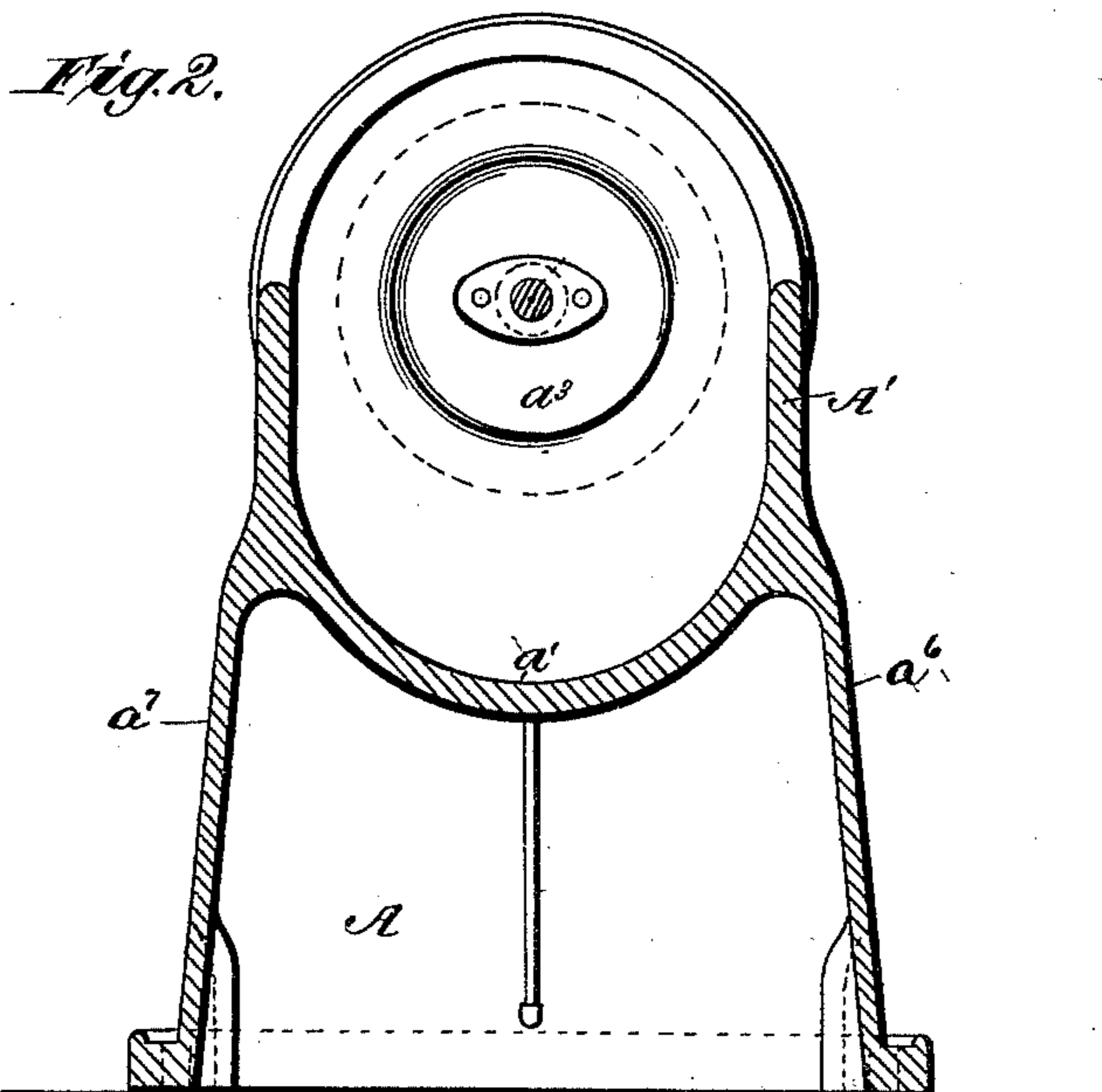
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3 Sheets—Sheet 2.

H. C. WHITE.
BED PLATE FOR STEAM ENGINES.

No. 440,674.

Patented Nov. 18, 1890.



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(No Model.)

3 Sheets—Sheet 3.

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Fig. 4.

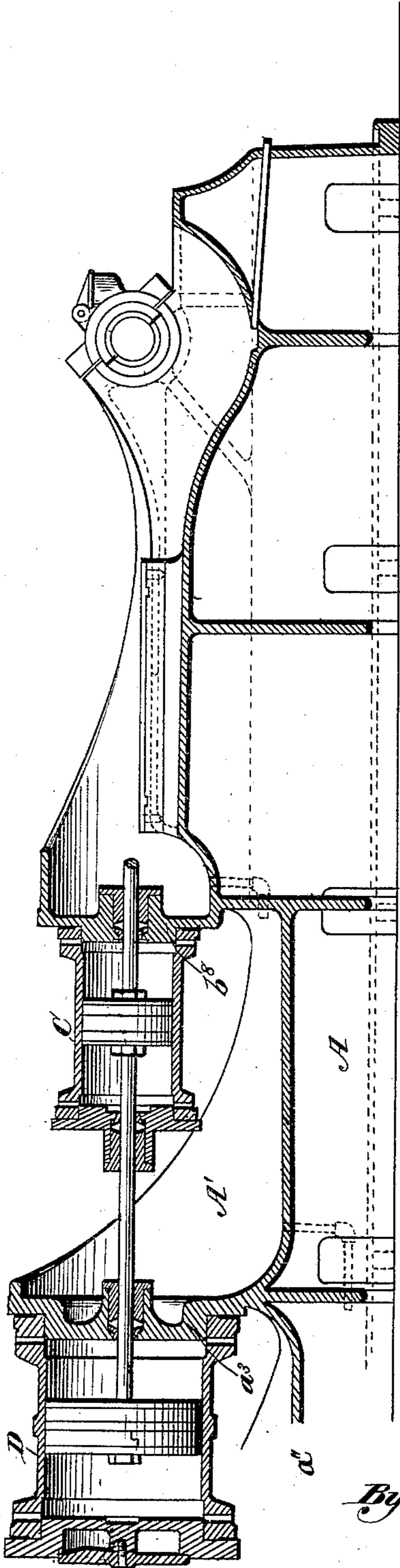
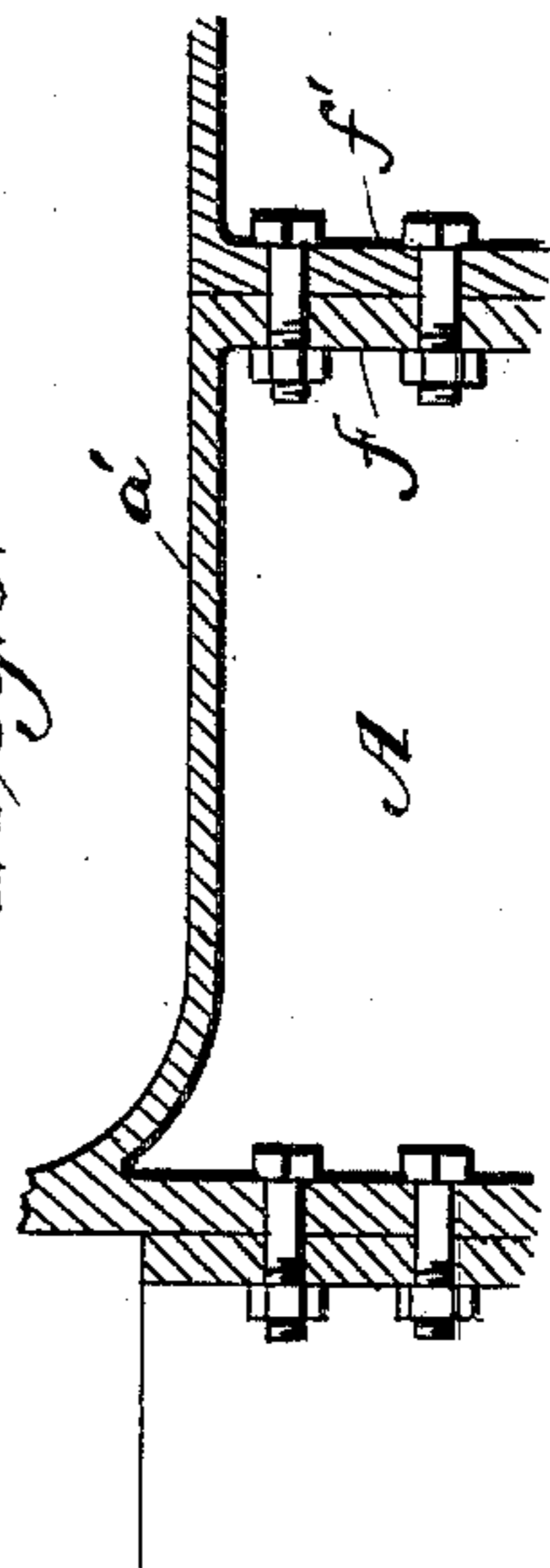


Fig. 5.



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UNITED STATES PATENT OFFICE.

HENRY C. WHITE, OF NEW YORK, N. Y.

BED-PLATE FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 440,674, dated November 18, 1890.

Application filed May 8, 1890. Serial No. 350,996. (No model.)

To all whom it may concern:

Be it known that I, HENRY C. WHITE, a citizen of the United States, residing at New York city, State of New York, have invented certain new and useful Improvements in Bed-Plates or Frames for Steam-Engines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters marked thereon, which form part of this specification.

My invention relates to the bed-plates or frames of steam-engines of the "tandem" type, and has for its object the construction of a frame which shall give a rigid support to the cylinders and connected parts and at the same time allow the cylinders to expand freely when heated without bringing distorting strains upon the frame.

By a "tandem" engine I mean a multiple-expansion engine having two or more cylinders, all having the same center line. Heretofore in engines of this class the rear cylinder, or the one farthest from the main shaft, has usually been attached to the forward cylinder, or the one nearest to the main shaft, by direct connections—such as sleeves, yokes, or bolts—and it has been customary also, in order to stiffen such connection and make it more rigid, to provide the rear cylinder with a vertical support from the ground or floor upon which the engine rested. With such a construction the expansion and contraction of the cylinders and the steam-pipes between them, as well as of other connections, due to differences in the temperatures of the different parts, caused resulting strains upon the parts, which were apt to bring the cylinders out of alignment with each other and to increase the friction of the pistons and their rod. At the same time unequal settling of the floor or its foundations under the different cylinders and the main shaft of the engine developed similar injurious strains. It is the purpose of my invention to overcome these disadvantages, and to accomplish this I avoid any direct connections between the cylinders themselves, and instead I attach each cylinder rigidly by its forward end to

stiffly-braced face-plates or abutments extending at right angles from and forming part of the bed-plate or frame of the engine, which at the same time is extended forward and under the cylinders. By this means each cylinder is allowed to expand and contract and without bringing strains upon the piston-rods or other connected parts of the engine.

In the drawings, in which the same letters refer to the same parts in all the figures, Figure 1 is a central vertical longitudinal section of my improved frame and its connected mechanism. Fig. 2 is a transverse vertical section of the same on the plane of the line xx in Fig. 1. Fig. 3 is a front elevation of the same, showing parts in section. Fig. 4 is a central longitudinal vertical section of a modified form of my improved frame in which the main bed-plate is cast integral with the supporting-frame of the main shaft and its connections; and Fig. 5 is a partial vertical section of a portion of a frame, showing the method employed of making the frame in sections when its size is too large to cast it in one piece.

In the drawings, A is my improved frame, consisting of the top plate a' , the end plates a^4 and a^5 , the sides a^6 and a^7 , and the stiffening ribs or braces a a a .

In Fig. 1 the top plate a' is shown supporting the main frame B, which is an ordinary frame for a single-cylinder engine, and to which it is secured by bolts in the manner commonly employed to attach an engine-frame to its foundation. This frame B is provided with a hood B', terminating in a vertical face-plate b^8 , to which is bolted the forward cylinder C, which in the drawings, is shown as the smaller or high-pressure cylinder, although the larger or low-pressure cylinder may be attached thereto, if desired.

The sides a^6 and a^7 of my improved frame are extended upward and inward back of the cylinder C and form the hood A', which is provided with the face-plate a^3 , to which is attached the rear cylinder D in the same manner that the cylinder C is attached to the face-plate b^8 of the hood B' and having the same center line as the cylinder C.

In Fig. 4 I show a modification of the de-

vice just described. In this figure the face-plate b^8 of the hood A^2 is made integral with the frame, as is the hood itself, and the separate main frame of the engine is dispensed with. The principle is unchanged; but there is a resulting economy in practice. In this same figure I have shown an extension a'' of the top plate a' under the cylinder D. This is meant to show how the bed-plate and frame can be further extended to support other and additional cylinders. In such cases other hoods would be provided with face-plates, to which the cylinders would be attached in the manner above indicated. The system is thus capable of indefinite expansion.

In Fig. 5 I show a method of making my improved frame in sections when it is too large to be conveniently cast in one piece. In such case the top plate a' is provided with downwardly-extending flanges f and f' at the ends of the sections, into which the frame is divided. These flanges, made to correspond on the sections which are to be adjacent, are bolted or secured together in any approved manner.

In my description and drawings I have referred only to horizontal engines; but the principle of construction which I have invented is equally applicable to vertical or inclined engines. In the case of vertical engines the face-plates would become horizontal mantels upon which the cylinders would rest. It is also obvious that the hoods may in many instances be dispensed with and that the face-plates or abutments upon which the cylinders are secured may spring directly from the frame.

The advantages of my invention are sim-

plicity of construction, durability and rigidity of the parts, and increased efficiency in the operation of the engine due to the elimination of the strains caused by the unequal expansion and contraction of the parts.

Having thus described my invention, what I claim as new is—

1. In a multiple-expansion engine of the tandem type having two or more cylinders, a frame or bed-plate provided with face-plates or abutments made integral therewith and adapted to receive and support the said cylinders at their forward ends.

2. In a multiple-expansion engine of the tandem type, a frame therefor provided with two or more hoods with terminating face-plates adapted to receive and support the cylinders of the engine, as shown and described.

3. In combination with a tandem engine, a bed-plate or frame prolonged underneath all of the cylinders of the engine and provided with side walls extended upward in front of each cylinder to form hoods, the faces of which are adapted to receive and support the said cylinders.

4. In combination with a compound tandem engine, the bed-plate B, with its hood B' and face-plate b^8 , and the frame A, with its hood A' and face-plate a^3 , substantially as shown.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY C. WHITE.

Witnesses:

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L. M. DOSCHER.