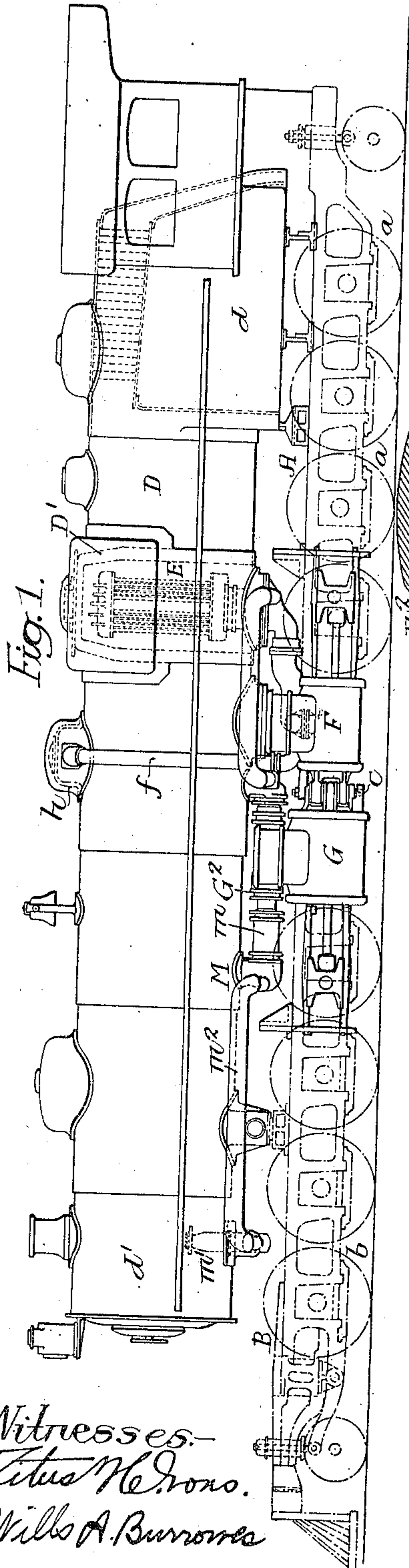


J. W. KENDRICK.  
ARTICULATED COMPOUND LOCOMOTIVE.  
APPLICATION FILED OCT. 23, 1908.

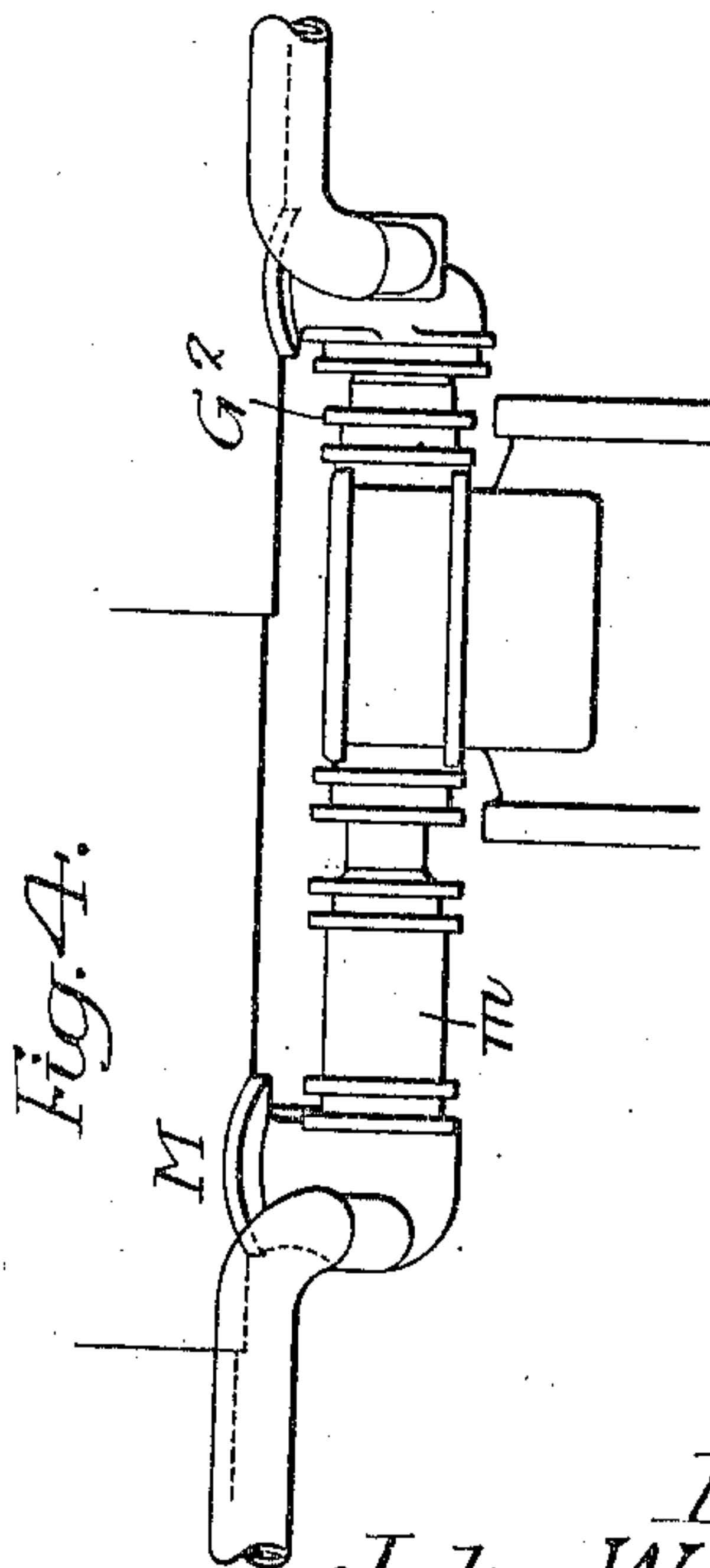
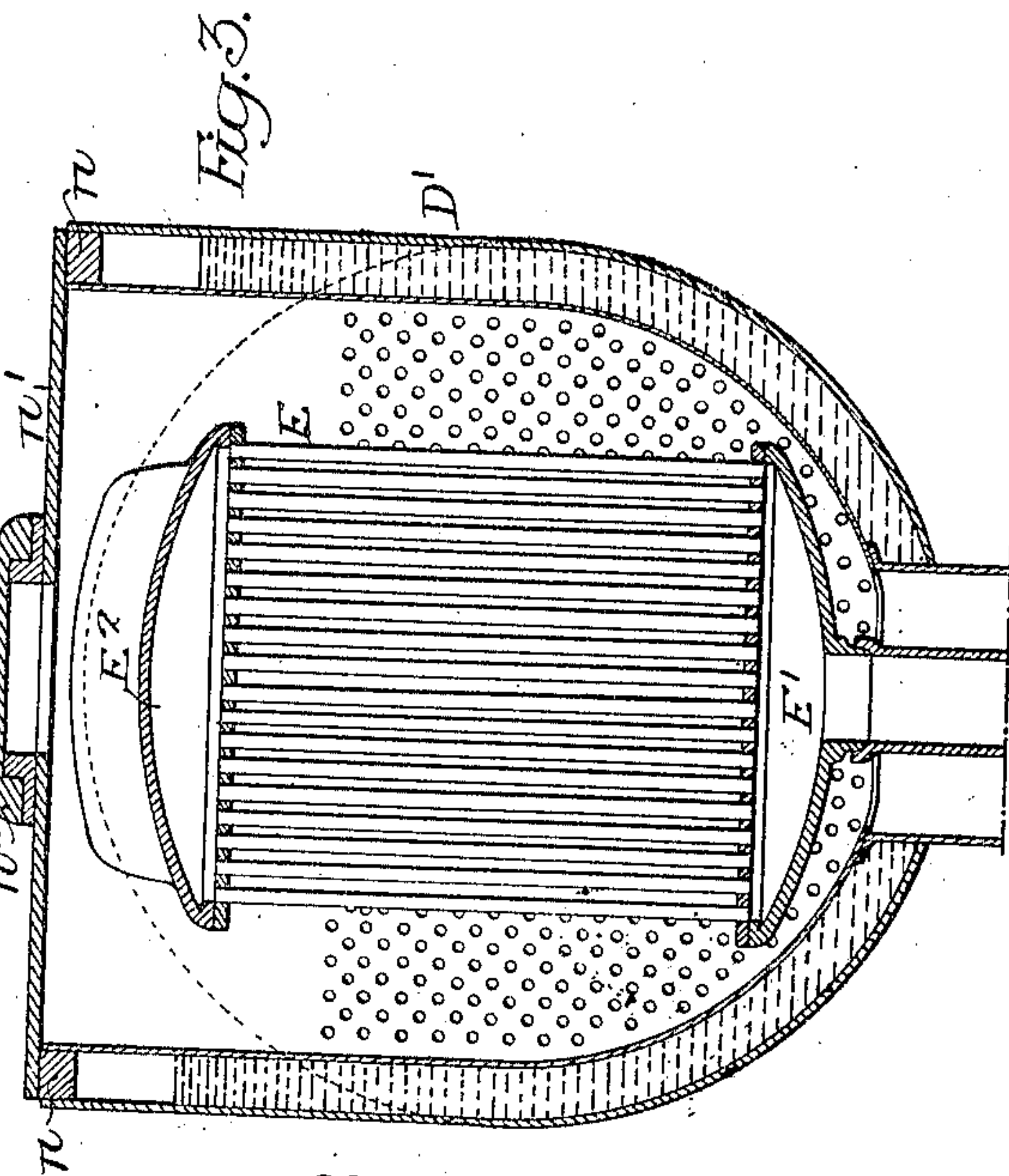
952,909.

Patented Mar. 22, 1910.

2 SHEETS—SHEET 1.



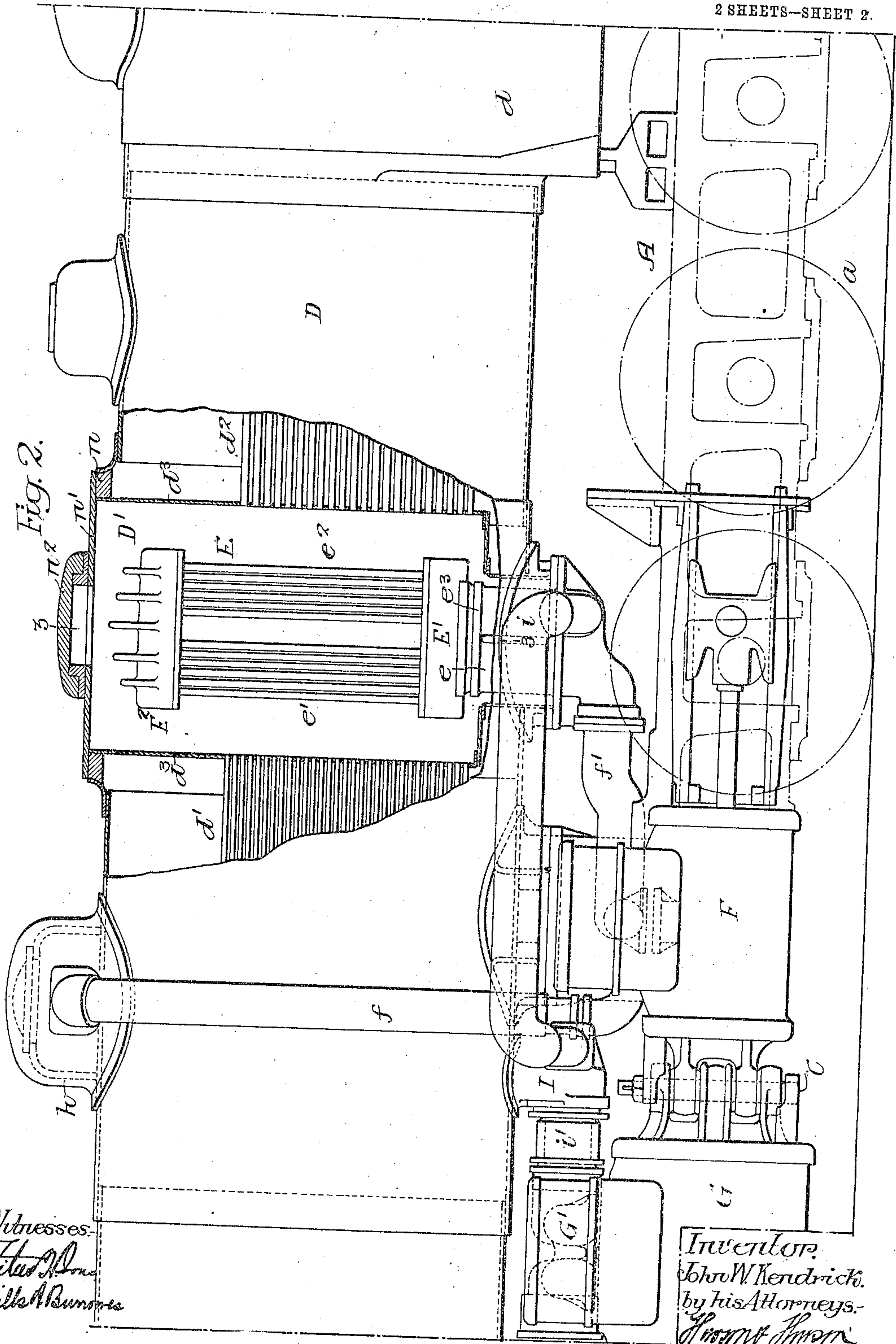
Witnesses:  
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Inventor:  
John W. Kendrick.  
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952,909.

2 SHEETS—SHEET 2.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

JOHN W. KENDRICK, OF CHICAGO, ILLINOIS.

ARTICULATED COMPOUND LOCOMOTIVE.

952,909.

Specification of Letters Patent.

Patented Mar. 22, 1910.

Application filed October 23, 1908. Serial No. 459,130.

To all whom it may concern:

Be it known that I, JOHN W. KENDRICK, a citizen of the United States, residing at Chicago, Illinois, have invented certain improvements in Articulated Compound Locomotives, of which the following is a specification.

My invention relates to certain improvements in articulated compound locomotives. In this type of locomotive there are two frames—one pivoted to the other—and the boiler is rigidly attached to one frame and extends over the other; the object being to so arrange the two frames as to provide a long wheel base for the locomotive yet the two frames will be so mounted that they can make a comparatively short turn. In this type of compound locomotive the high pressure cylinders are carried by one frame and drive the wheels mounted on that frame. The low pressure cylinders are carried by the other frame and drive the wheels carried by that frame.

One object of the present invention is to so arrange the cylinders that they will be close together, and a further object of the invention is to arrange a superheater in such a manner that steam will pass through it either before or after entering the high pressure cylinders, or after leaving the high and prior to entering the low pressure cylinders. These objects I attain in the following manner, reference being had to the accompanying drawings, in which:—

Figure 1, is a side view of a compound articulated locomotive illustrating my invention; Fig. 2, is an enlarged side view of a portion of a locomotive showing part of the boiler in section, illustrating the superheater; Fig. 3, is a transverse section on the line 3—3, Fig. 2; and Fig. 4, is a detached view showing the pipe coupling.

A is the rear frame of the locomotive having driving wheels *a*. B is the forward frame having driving wheels *b*. These two frames are coupled together by pins *c* which pass through an ordinary coupling head; one series of coupling heads being on one frame and the other series on the other frame.

D is the boiler mounted rigidly on the rear frame and projecting over the forward frame. The boiler is flexibly supported on the frame B so as to allow it to swing with the rear frame and independently of the forward frame; there being provided on said

latter frame one or more slides or guideways placed to suitably co-act with one or more saddles fixed to the overhung portion of the boiler.

*d* is the fire box of the boiler and *d'* is the smoke box.

D' is the secondary combustion chamber in which is mounted the superheater E, in the present instance; the tubes *d*<sup>2</sup> of the boiler being discontinued at this point and the combustion chamber being attached to the tube sheets *d*<sup>2</sup>, as clearly shown in Fig. 2. Other forms of superheaters may be used without departing from the essential features of my invention.

F, F are the high pressure cylinders, one mounted on each side of the frame A at the forward end.

G, G are the low pressure cylinders, one mounted at each side of the frame B at the rear end of said frame, so that with this arrangement the high and low pressure cylinders are brought very close together. In the particular case illustrated the high pressure cylinders F receive steam from the dome *k* of the boiler through the pipe *f*, while the low pressure cylinders G receive steam from the high pressure cylinders F, but this steam travels through a superheater E before passing to the low pressure cylinders. In the present instance the connection is made through a pipe *f'* up through a passage *e* to one side *e'* of the superheater and down through the side *e*<sup>2</sup> to a passage *i* leading to a head I supported by the frame A or the boiler D, as the case may be, and this head is coupled to a head G' communicating with the low pressure cylinder G through a coupling pipe *i'*. This coupling pipe is so formed that it can have movement in each head to accommodate itself to the movement of one frame independently of the other.

The exhaust from the low pressure cylinders passes through a head G<sup>2</sup>, through a pipe *m* connected to a head M secured to the underside of the boiler casing, in the present instance, and extending from this head to the nozzle *m'* is a pipe *m*<sup>2</sup>. The pipe *m* may be made in the same manner as the pipe *i*, so as to accommodate itself to the movement of the boiler.

While any form of superheater may be used, I preferably use the construction illustrated in the drawings, which consists of a lower header E' having pipes *e* and *e*<sup>2</sup> for the passage of the steam to and from the



superheater. The lower header  $E'$  is connected to an upper header  $E^2$  by vertical pipes  $e'$  and  $e^2$ , one forming one side of the superheater and the other the opposite side of the superheater.

By mounting the superheater in the secondary combustion chamber of the boiler I can bring the superheated steam to the proper degree as the products of combustion pass directly from the fire box through the tubes into the secondary combustion chamber and then pass through the other tubes to the smoke box. Moreover, by this arrangement I can make very short connections between the high and low pressure cylinders and the superheater so that little loss is sustained due to the travel of the steam through the connecting pipes.

The particular form of combustion chamber shown consists of a shell secured to the boiler shell through an annular ring  $n$  and closed by a cover plate  $n'$  and man-hole cover  $n^2$ . This form of combustion chamber is fully set forth and claimed in an application for patent filed by Kenneth Rushton on the 30th day of July 1908, under Serial Number 446,108, and I lay no claim to this construction. Any other form of central combustion chamber in the boiler proper, smoke box, or fire box can be used in this connection, and for the purposes set forth in my description.

I claim:—

1. The combination in a compound locomotive of the articulated type, of front and rear frames, driving wheels mounted on each frame, high pressure cylinders at the forward end of the rear frame, low pressure cylinders at the rear end of the forward frame, a boiler mounted on the rear frame and extending over said forward frame, said boiler having a secondary combustion chamber in close proximity to the high pressure cylinders, a superheater mounted in said combustion chamber, a rigid connection between the high pressure cylinders and the superheater, and a flexible connection between the superheater and the low pressure cylinders.

2. The combination in a compound locomotive of the articulated type of front and rear frames; driving wheels mounted on each frame; high pressure cylinders at the forward end of the rear frame; low pressure cylinders at the rear end of the forward frame; a boiler mounted on the rear frame and extending over said forward frame; a super-heater connected between the high and low pressure cylinder; a head connected to the exhaust passages of the low pressure cylinders; a second head mounted on the under

side of the boiler; a pipe connecting said heads; and an exhaust nozzle connected to the second head.

3. The combination in a compound locomotive of the articulated type, of a rear frame; a forward frame coupled to the rear frame; high pressure cylinders at the forward end of the rear frame; low pressure cylinders at the rear of the forward frame; a boiler mounted on the rear frame and extending over the forward frame; a secondary combustion chamber in the boiler above the rear frame; a super-heater mounted within the combustion chamber; a pipe extending from the dome of the boiler to the high pressure cylinders; a pipe extending from the exhaust passage of the high pressure cylinders to the inlet end of the superheater; a pipe leading from the outlet end of the super-heater to the inlet port of the low pressure cylinders; said pipe having a flexible section to permit of movement of the boiler independently of the forward frame; a flexible exhaust pipe leading from the exhaust passage of the low pressure cylinders; a head attached to the boiler and connected to said pipe; a nozzle in the smoke box of the boiler; with a pipe leading from said head to said nozzle.

4. The combination in a compound locomotive of the articulated type, of a rear frame; a forward frame; said frames being coupled together; high pressure cylinders at the forward end of the rear frame; low pressure cylinders at the rear of the forward frame; a boiler mounted on the rear frame and extending over the forward frame; a super-heater in connection with the boiler; a pipe extending from the dome of the boiler to the inlet port of the high pressure cylinders; a pipe extending between the high pressure cylinders and the inlet end of the super-heater; a pipe leading from the outlet end of the super-heater to the low pressure cylinders; said pipe having a flexible section to permit of the movement of the boiler independently of the forward frame; a head connected to the boiler; a flexible exhaust pipe leading from the exhaust passage of the low pressure cylinders to said head; and a nozzle in the smoke box of the boiler; with a pipe leading from said head to said nozzle.

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

JOHN W. KENDRICK.

Witnesses:

C. W. KRUM,

F. H. APPLETON.