

976,014.

S. M. VAUCLAIN.
ARTICULATED LOCOMOTIVE.
APPLICATION FILED OCT. 9, 1909.

Patented Nov. 15, 1910.

5 SHEETS-SHEET 1.

Fig. 1.

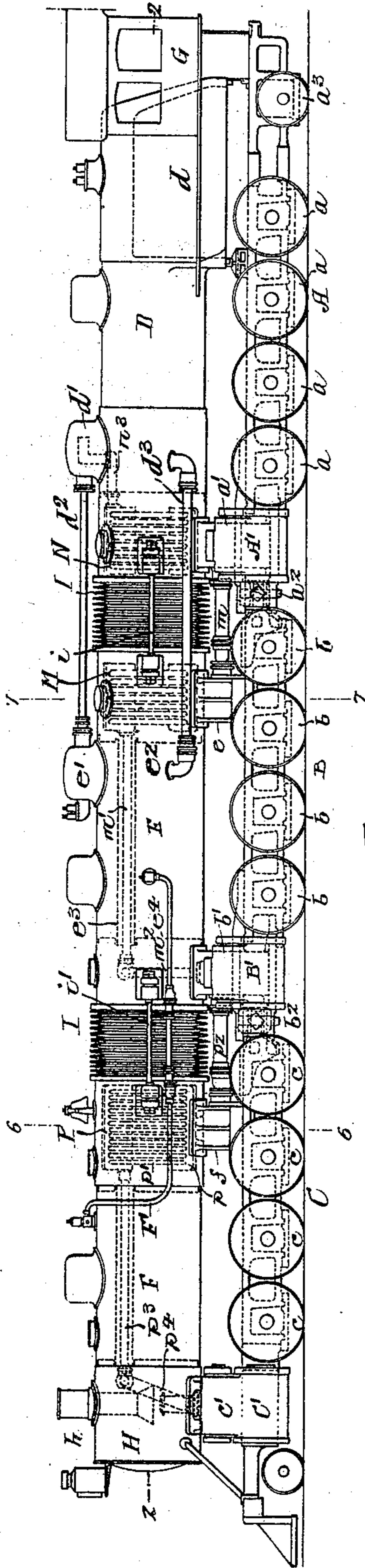
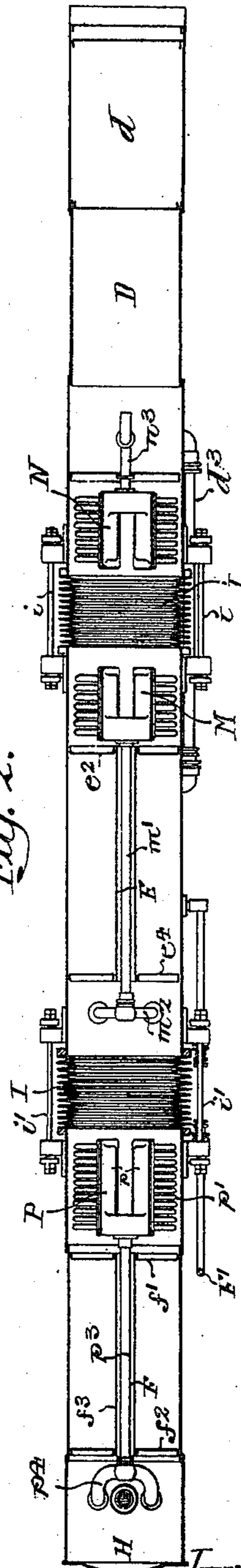


Fig. 2.



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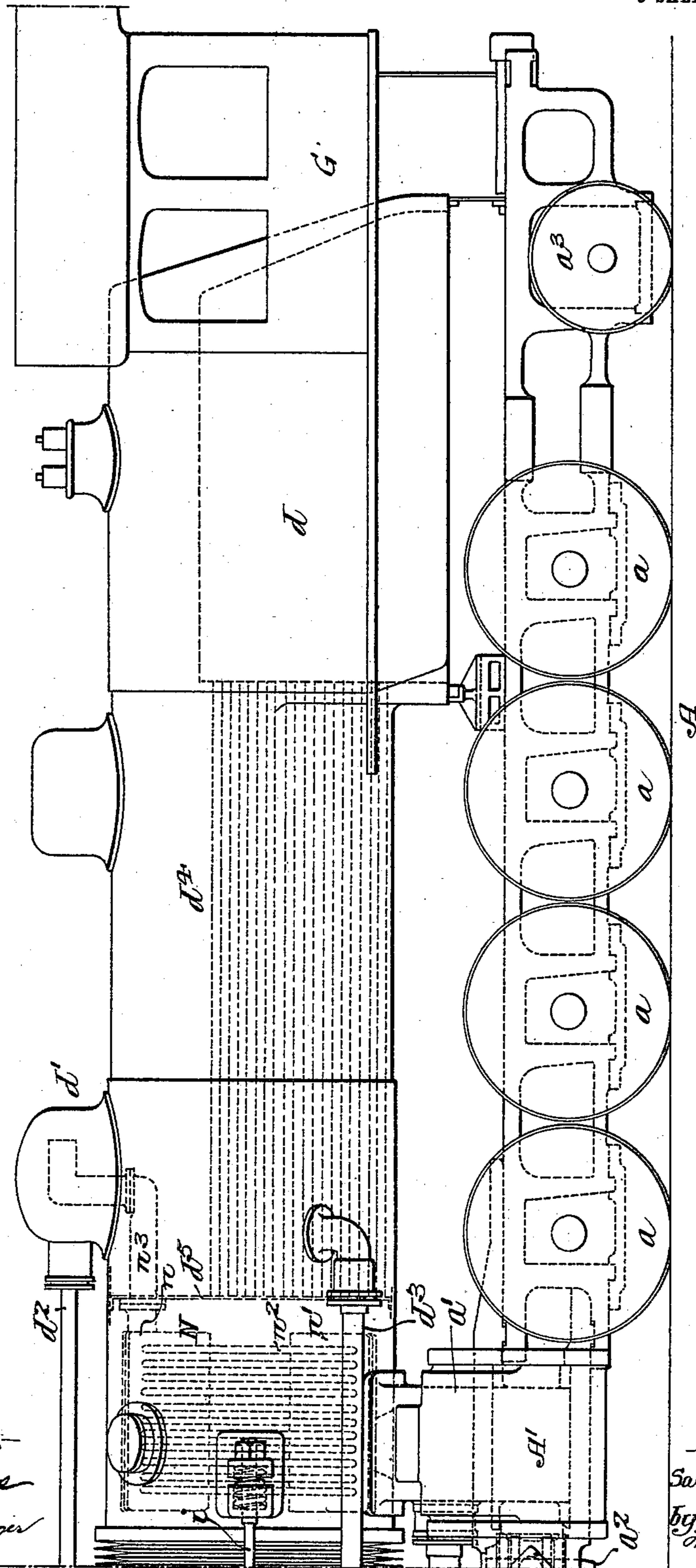
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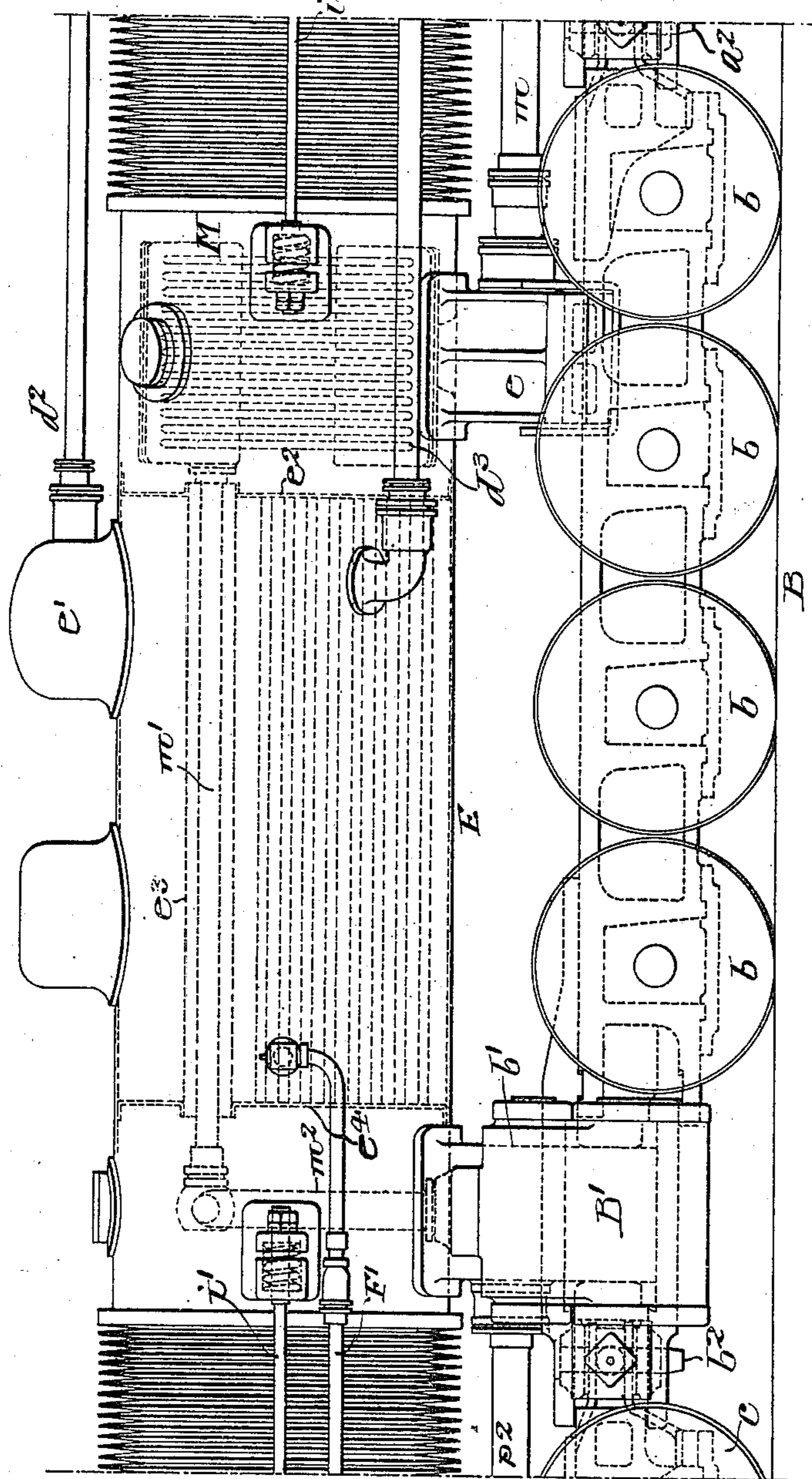
Fig. 3.



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Willard A. Pullinger

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by his Attorneys
Horn & Horn

Fig. 4.



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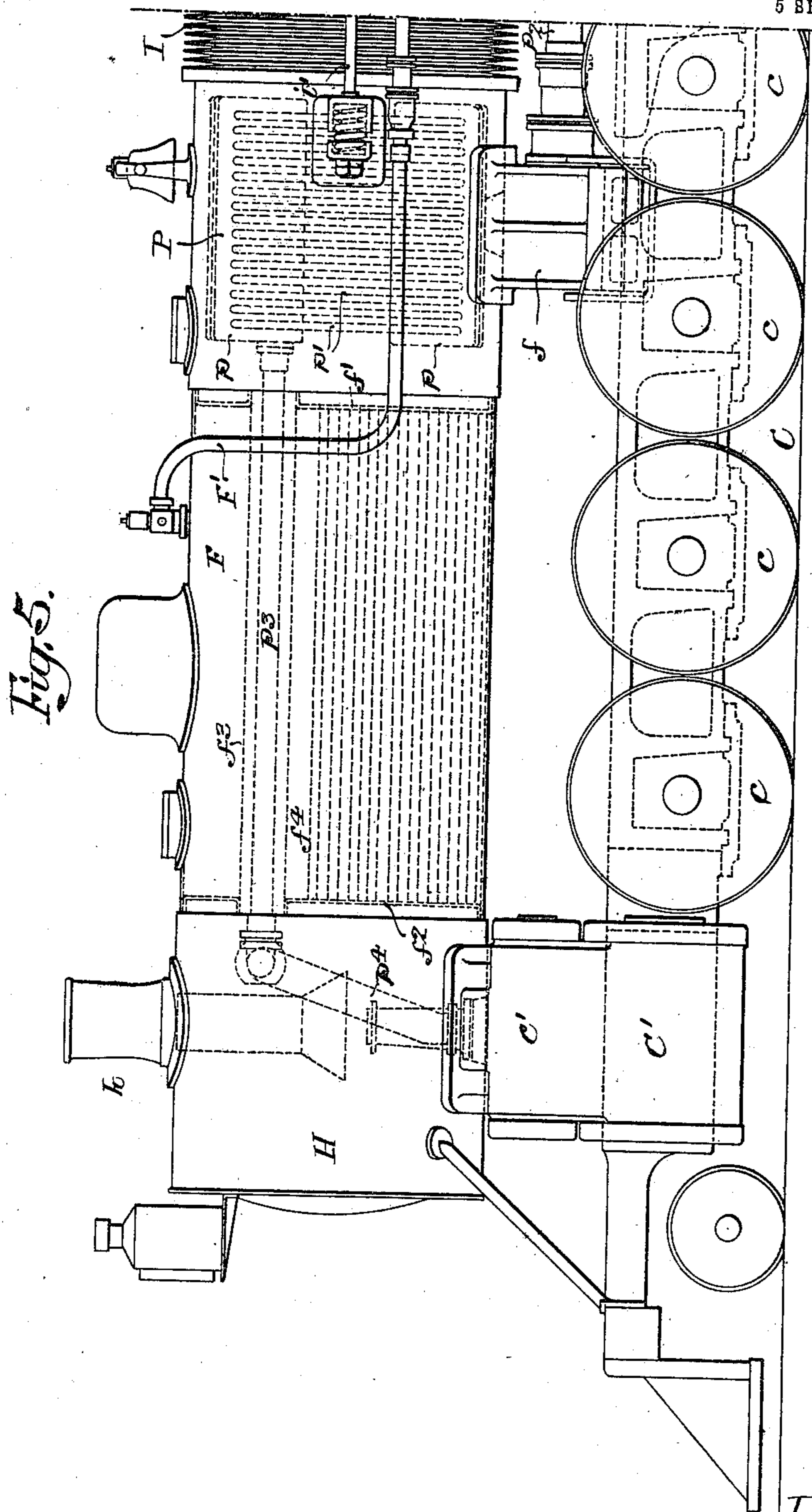
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5 SHEETS—SHEET 4.



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5 SHEETS-SHEET 5.

Fig. 7.

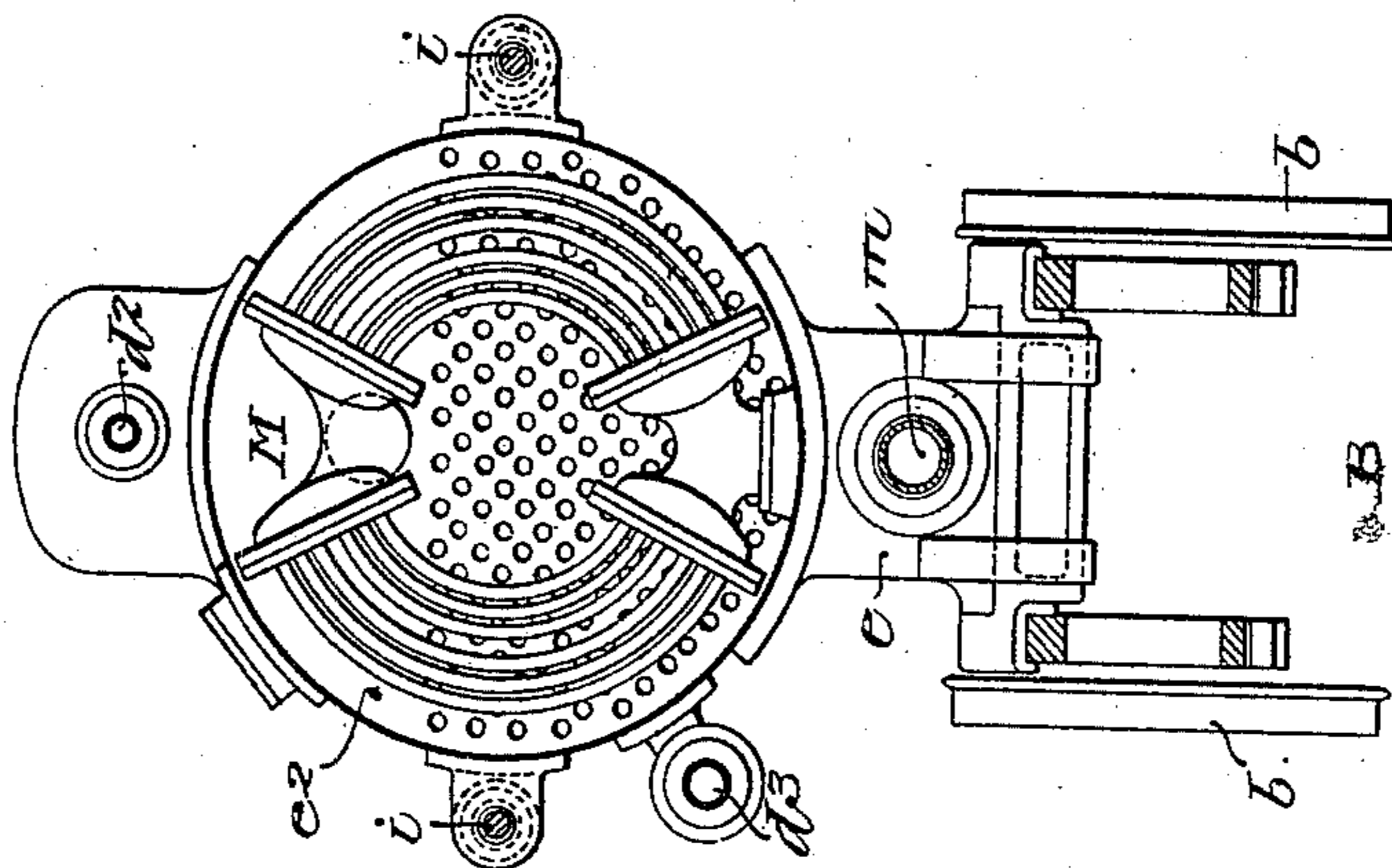
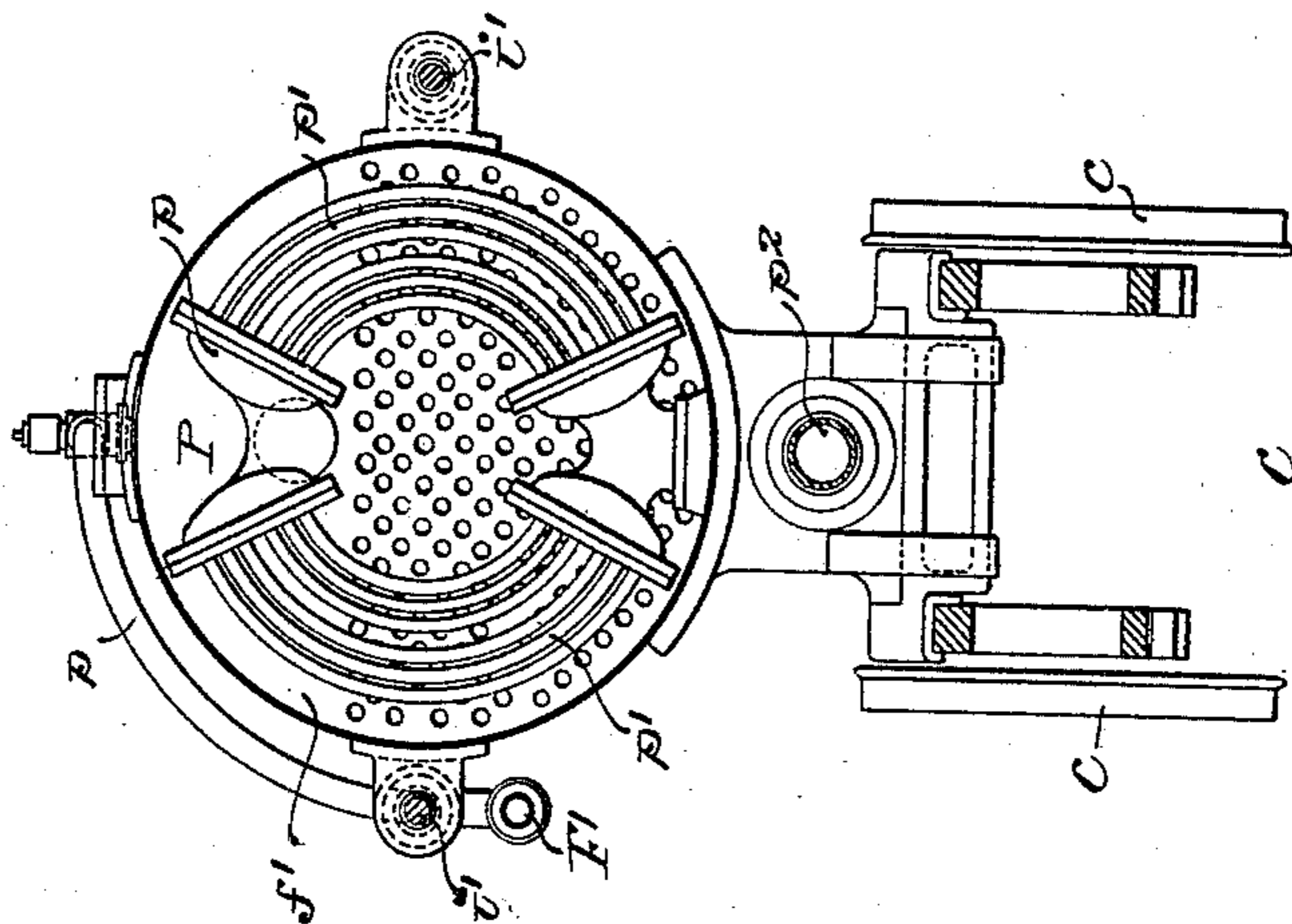


Fig. 6.



Witnesses.-

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Walker H. Cullinger

Inventor.-

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by his Attorneys.

Howard M. Brown

UNITED STATES PATENT OFFICE.

SAMUEL M. VAUCLAIN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO BALDWIN LOCOMOTIVE WORKS, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

ARTICULATED LOCOMOTIVE.

976,014.

Specification of Letters Patent.

Patented Nov. 15, 1910.

Application filed October 9, 1909. Serial No. 521,904.

To all whom it may concern:

Be it known that I, SAMUEL M. VAUCLAIN, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Articulated Locomotives, of which the following is a specification.

My invention relates to certain improvements in articulated locomotives.

The object of the invention is to construct what may be termed a triple expansion articulated locomotive, in which there are three frames pivotally connected in tandem, each frame carrying a pair of cylinders, and the frames have also rigidly secured to them sections of the boiler; the boiler sections being connected together by flexible joints. In this type of engine there is one fire box and one smoke box at opposite ends of the locomotive, and the products of combustion pass from one boiler section to another through intervening combustion chambers formed at the conjunction of one section with another. Each frame carries independent driving mechanism and the steam is expansively passing from the high pressure cylinders on the rear frame to the intermediate cylinders of the intermediate frame and finally to the low pressure cylinders of the forward frame, the steam from the low pressure cylinders passing to the stack in the ordinary manner.

In the accompanying drawings:—Figure 1, is a side view of my improved locomotive, the unnecessary details being omitted to avoid confusion; Fig. 2, is a sectional plan view on the line 2—2, Fig. 1; Fig. 3, is an enlarged side view of the rear engine and the boiler section carried thereby; Fig. 4, is a side view of the intermediate engine and the boiler section carried thereby; Fig. 5, is a side view of the forward engine and the boiler section mounted thereon; Fig. 6, is a transverse sectional view on the line 6—6, Fig. 1; and Fig. 7, is a transverse sectional view on the line 7—7, Fig. 1.

Referring to the drawings, A is the rear frame of the locomotive, A', A' are the high pressure cylinders mounted on the forward end of the frame in the present instance, and a, a are the driving wheels which are

driven from the cylinders A'; the connections being omitted to avoid confusion.

a', a' are the steam chests of the cylinders A', and a³, a³ are the trailer wheels.

B is an intermediate frame, and mounted in the forward end of this frame, in the present instance, are the intermediate cylinders B'.

b, b are the driving wheels and b', b' are the steam chests.

The frame B is pivotally connected to the frame A at a², in the present instance by a pin connection, so that one frame will swing independently of the other in passing around a curve.

C is the forward frame of the locomotive connected to the intermediate frame at b² by a pin, connected as shown at Fig. 1.

C' is the low pressure cylinder mounted in the forward end of the frame C in the present instance.

c, c are driving wheels and c' is the steam chest.

The boiler is made up of three sections D, E and F and these sections are connected by flexible sections I, I'. These flexible sections are similar to the flexible sections set forth and claimed in the patent granted to me on the sixteenth day of February 1909, Number 912,923.

G is the cab of the locomotive located on the rear of the frame A, and H is the smoke box mounted on the forward end of the frame C.

The main boiler section D is rigidly mounted on the rear frame A, the auxiliary boiler section E is rigidly mounted on the intermediate frame B, and the forward section F, which, in the present instance, is used as a water heater, is mounted rigidly on the forward frame C.

d is the fire box of the locomotive, d' is the steam dome connected by a pipe d² to the steam dome e', in the present instance on the auxiliary boiler E.

The two sections D and E are also connected by pipes d³ at each side of the locomotive, as shown in Fig. 1. The two sections are also connected by rods i flexibly mounted in boxes secured to each of the sections, as illustrated in the above men-

tioned patent. The section E is mounted on the rear support e and on the saddle of the cylinders B' and is connected to the forward water heating section F, by the rods i' flexibly mounted in bearings secured to both sections, as illustrated. The forward section F is mounted on the saddle of the cylinder C' and on a rear support f , so that it will be seen that while the boiler sections are rigidly mounted on their respective frames they are flexibly connected and the products of combustion pass from the single fire box d through the three sections to the smoke box H, which is provided with the usual stack h .

The main boiler section D is provided with tubes d^4 which extend from the fire box d to the tube sheet d^5 , some distance back of the forward end of the section. The space between the tube sheet d^5 and the tube sheet e^2 of the section E forms the first intermediate combustion chamber, and mounted in the forward end of the section D is a superheater N of any suitable type, in the present instance having headers n, n' with connecting tubes n^2 . This superheater is connected by a pipe n^3 with a steam dome d' and with the steam inlet passages of the cylinders A' , so that the steam is superheated as it passes from the main boiler section D to the high pressure cylinders.

In the rear end of the section E is a reheater M, which communicates through a pipe m with the exhaust passage of the high pressure cylinders A' and with a pipe m' which extends through an enlarged flue e^3 in the auxiliary boiler section E, and the space beyond the front tube sheet e^4 where it connects by pipes m^2 with the steam supply passages of the intermediate cylinders B' , as clearly illustrated in Fig. 4. The arrangement of the pipe m within the flue e^3 is fully set forth and claimed in an application for patent filed by George H. Emerson on the 9th day of October under Serial No. 521882. I lay no claim to this particular construction.

In the rear portion of the forward section F, back of the tube sheet f' is a chamber in which is mounted a re-heater P having headers p and connecting pipes p' similar to the super-heater N and re-heater M. This re-heater is connected by a pipe p^2 with the exhaust passage of the intermediate cylinders B' and with the live steam space of the low pressure cylinder through the pipes p^3 and p^4 . The pipe p^3 passes through a flue f^3 extending between the rear header f' and the forward header f^2 of the section F in the same manner as the flue e^3 . The section F has the ordinary flue tubes f^4 , and this section is used in the present instance as a water heating section, and is connected by

one or more pipes F' with the auxiliary boiler section E. In place of the equalizing pipes d^3, d^3 shown between the sections E and D, pipes similar to the pipe F' may be used at this point, as well as between the sections F and E, when the auxiliary boiler is used as feed water heater.

While I have shown a particular form of flexible connection between the sections, any suitable connection may be used without departing from my invention.

It will be noticed by the above construction that I have been able to make a locomotive in which there are three frames coupled together, each frame carrying independent driving mechanism, and the steam passes from the main boiler section through the several cylinders, and their connections, all the connections being within the boiler sections. In the present instance there is a main boiler section having flue tubes, an auxiliary section also having flue tubes connected to the main boiler section, and a feed water heater section having flue tubes connected to the intermediate or auxiliary section, so that the water enters the first section F and is heated prior to being admitted to the auxiliary section and main boiler section.

There is only one fire box and one smoke box, and one engineer controls the mechanism of the locomotive.

I claim:—

1. The combination in a locomotive, of three frames pivotally connected one to another, each frame carrying a boiler section, said boiler sections being flexibly connected and each frame carrying independent cylinders and driving mechanism.

2. The combination in a locomotive, of three frames pivotally connected one to another, a boiler section mounted on each frame, said boiler sections being flexibly connected one to another, each frame carrying independent cylinders and driving mechanism, and pipes leading from the boiler sections to the several cylinders, said pipes being within the boiler.

3. The combination in a locomotive, of three frames pivotally connected one to another, boiler sections carried by said frames, a high pressure cylinder mounted on the rear frame, an intermediate cylinder mounted on the intermediate frame, a low pressure cylinder mounted on the forward frame, with pipes connecting the several cylinders, and driving gear on each frame.

4. The combination in a locomotive, of three frames, the frames being pivotally connected one to another, a boiler section on each frame, said boiler sections being flexibly connected, a high pressure cylinder on the rear frame, an intermediate cylinder on

the intermediate frame, a low pressure cylinder on the forward frame, driving mechanism connected with the several cylinders, a superheater mounted between the main boiler and the high pressure cylinder, a re-heater between the high pressure cylinder and the intermediate cylinder, a re-heater mounted between the intermediate cylinder and the low pressure cylinder, and pipes connecting the several superheaters and re-heaters with their respective cylinders.

5. The combination in a locomotive, of three frames pivotally connected, a high pressure cylinder on one frame, an intermediate cylinder on another frame, a low pressure cylinder on the third frame, a boiler section mounted on the frame carrying the high pressure cylinder, an auxiliary boiler rigidly mounted on the frame carrying the intermediate cylinder, a feed water heater rigidly mounted on the frame carrying the low pressure cylinder, connections for the said cylinders extending through the boiler sections, with flexible connections

coupling the several sections of the boiler, said couplings inclosing the intermediate combustion chambers.

6. The combination in a locomotive, of three frames pivotally connected, a cylinder, a driving mechanism on each frame, and a boiler made in three sections extending over the said frames, the said sections being flexibly connected.

7. The combination of three frames pivotally connected, cylinders and driving mechanism on each frame, one set of cylinders being high pressure, another set intermediate, and the third set low pressure cylinders, a boiler and pipes connecting the high pressure cylinders with the boiler, and connections between the several cylinders.

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

SAMUEL M. VAUCLAIN.

Witnesses:

WILLIAM VOLLMER,
EDWIN W. THOMAS.