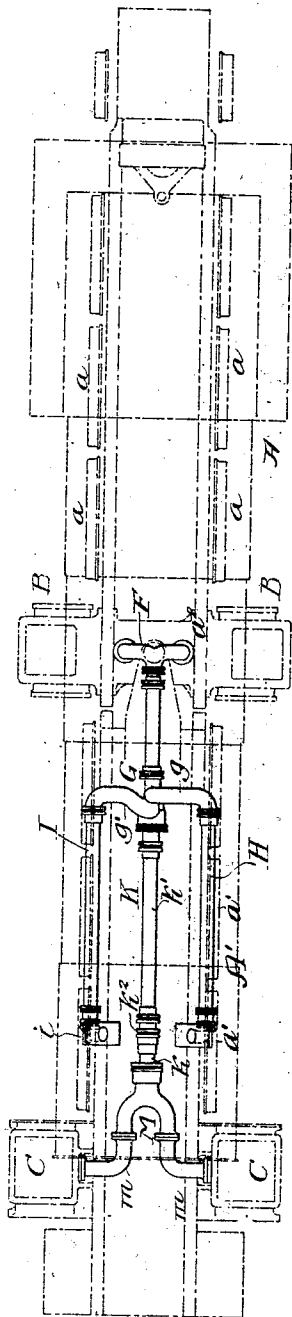
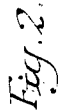


C. A. DWINELL.
SUPERHEATER FOR LOCOMOTIVES.
APPLICATION FILED OCT. 15, 1907.

Patented Dec. 27, 1910.

2 SHEETS--SHEET 1.

980,078.



Witnesses:
Augustus B. Coppel
Titus Wilson

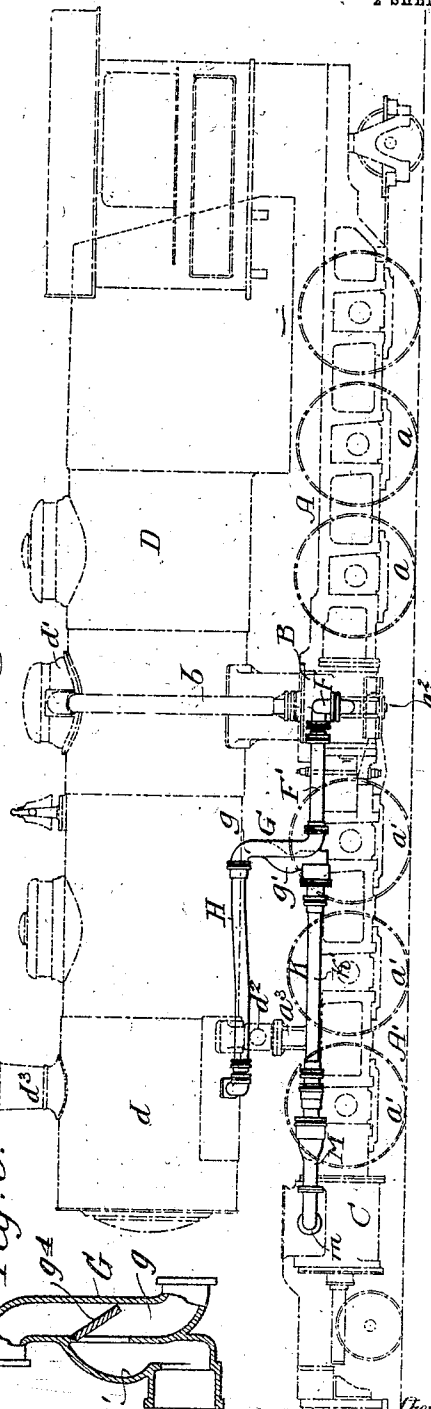
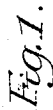
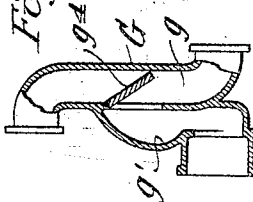


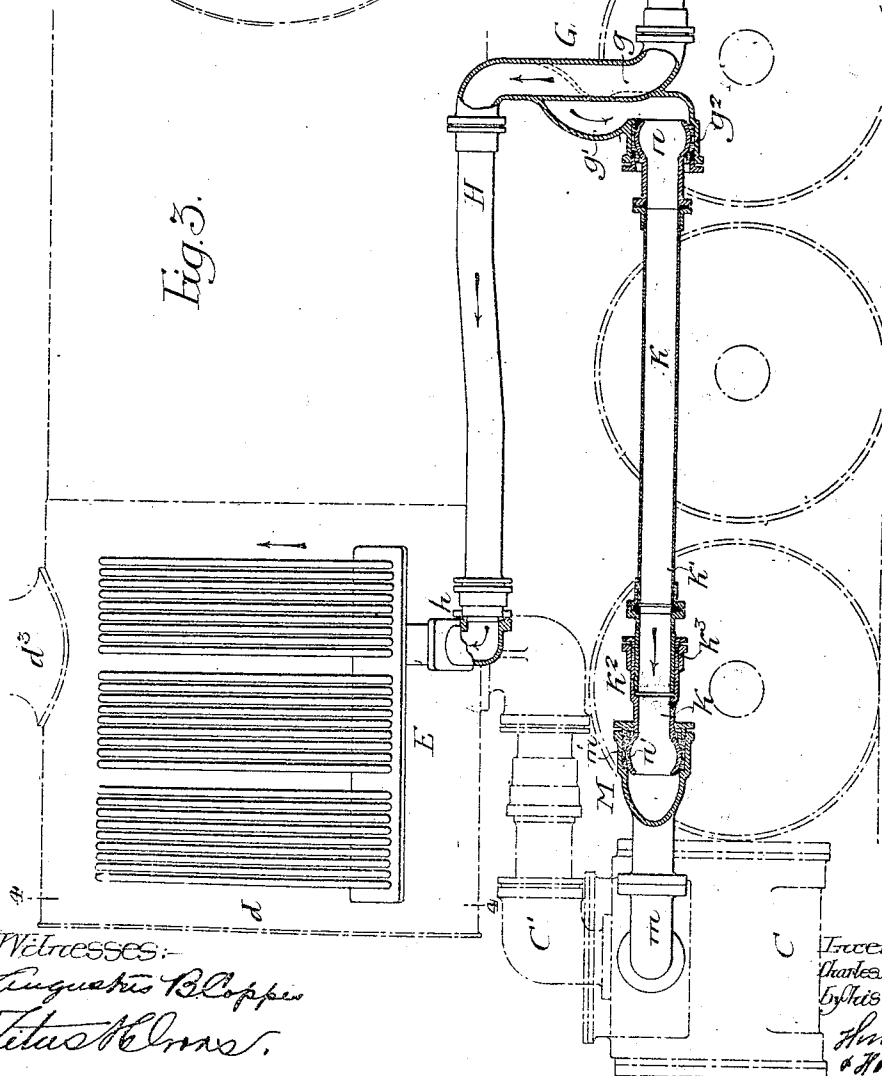
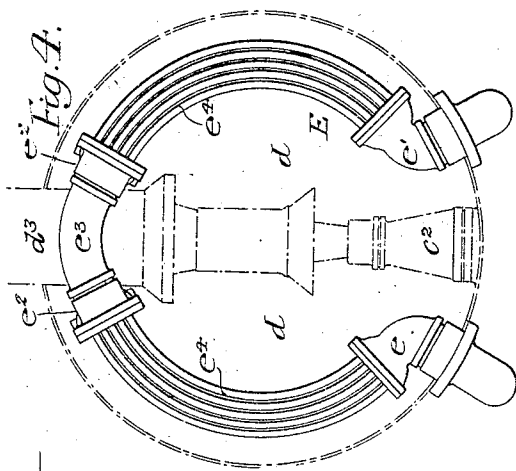
Fig. 5.



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980,078.

2 SHEETS--SHEET 2.



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UNITED STATES PATENT OFFICE.

CHARLES A. DWINELL, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO BALDWIN LOCOMOTIVE WORKS, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

SUPERHEATER FOR LOCOMOTIVES.

980,078.

Specification of Letters Patent.

Patented Dec. 27, 1910.

Application filed October 15, 1907. Serial No. 397,482.

To all whom it may concern:

Be it known that I, CHARLES A. DWINELL, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Superheaters for Locomotives, of which the following is a specification.

The object of my invention is to provide a superheater for a locomotive of the type known as an "articulated compound". This type of engine is provided with two frames, one pivoted to the other with the high pressure cylinders on one frame and the low pressure cylinders on the other frame.

The locomotive boiler is rigidly secured to the rear frame and is adapted to radially slide upon the forward frame.

By my invention I am enabled to mount the superheater in the smoke box of the locomotive, connecting one side of the superheater with the high pressure cylinder and the other side of the superheater with the low pressure cylinder.

In the accompanying drawings:—Figure 1, is a side view in dotted lines of an articulated compound locomotive showing the superheating apparatus in full lines; Fig. 2, is a plan view of Fig. 1 drawn in the same manner; Fig. 3, is an enlarged sectional view showing an outline of a portion of the locomotive in dotted lines and the superheater and its connections in full lines; Fig. 4, is a section through the smoke box on the line 4—4, Fig. 3; Fig. 5, is a view of a modification.

A is the rear frame of the locomotive and A' is the forward frame of the locomotive, each having boxes for driving wheels a and a' respectively. These two frames are pivoted together at a^2 by any suitable connection.

B, B are the high pressure cylinders mounted rigidly on the frame A, and C, C are the low pressure cylinders mounted rigidly on the frame A'. The high pressure cylinders B are connected by live steam pipes b to the steam dome d' of the boiler D; this boiler is mounted rigidly on the rear frame A and swings with it. The front end of the boiler overhangs the forward

ward frame and has one or more saddles d^2 which are arranged to slide upon supports a^3 carried by the said frame, so that the boiler is free to move radially over the forward frame in turning curves.

d is the smoke box of the boiler, and in this smoke box I place the superheater E. This superheater can be of any form desired providing it does not interfere with the internal arrangement of the smoke box.

In the present instance the superheater consists of two headers e, e' at the lower end, and two headers e^2 at the upper end connected together by a pipe e^3 . The upper and lower headers are connected by curved tubes e^4 arranged on each side of the smoke box, as indicated in Fig. 4. One side of the superheater is connected to the exhaust passage of the high pressure cylinders and the other side of the superheater is connected to the steam inlet passage of the low pressure cylinders.

F is a transverse steam pipe coupled at each end to the exhaust passage b' of the high pressure cylinders B. This pipe is connected to a longitudinal pipe F' extending to a fitting G containing two steam passages g, g' . The pipe F' is connected to the lower end of the fitting and communicates with the passage g , and the upper end of this passage is curved outward and acts with a pipe H having a right angle coupling h which is connected to the lower header e' of the superheater E on one side of the smoke box. The several pipes are connected together by suitable joints so as to make the connection between the high pressure cylinders and the superheater steam tight.

It will be noticed that the series of pipes just alluded to above are all rigid, as the superheater is mounted in the smoke box of the locomotive boiler which is rigidly secured to the frame A on which the cylinders B are mounted, but the connection between the superheater and the low pressure cylinders C must be flexible so as to allow the forward frame to move independently of the rear frame, and to accomplish this I extend the pipes connecting the superheater with

the low pressure cylinder to a point as near the pivot point as possible.

I is a pipe on the side of the locomotive opposite that on which the pipe H is placed and this pipe is connected to the header *e* by a union *i*. The pipe extends rearward and is connected to the curved member *g'* of the fitting G and this curved member connects with a socket *g*².

K is a pipe leading from the fitting G to a yoke fitting M which is connected by curved pipes *m* to the steam supply passages of the low pressure cylinders C, C situated at the forward end of the frame A'. The pipe K is made in two sections *k* and *k'*; the section *k* has an enlarged portion *k*² into which extends the end of the section *k'* and there is a packing *k*³ which prevents leakage, yet allows the two parts *k*, *k'* of the pipe K to telescope so as to accommodate the independent movement of the frame A' with the frame A. The rear end of the pipe K is in the form of a hollow ball *n* which rests in the socket *g*² while the forward end *n'* of the pipe K is made in the form of a ball which rests in the socket *m'* on the yoke fitting M, so that when the two arms move independently this connection will allow freedom of movement and yet the pipes will be steam tight, preventing leakage at any point, as each socket is provided with a packed joint.

Attached to the opposite end of the pipe K' is a pipe K³ similar to the pipe K² adapted to a packed joint *m*² forming a part of the fitting M' and this pipe also has a ring *k*³ to hold it in place and allow it to freely swing. The connections may be slightly modified without departing from the main feature of the invention which is to place a superheater in the smoke box of the boiler on the rear frame and couple it to cylinders on the forward frame of the locomotive.

Thus it will be seen that by the above described invention I am enabled to superheat the steam after it passes from the high pressure cylinders and before it enters the low pressure cylinders in the type of engine in which the low pressure cylinders are carried on a frame pivoted to the frame carrying the high pressure cylinders. Thus the steam enters the high pressure cylinders direct from the dome of the locomotive boiler, escapes through the exhaust passage, enters the pipe F, passes through the pipe F', through section *g* of the fitting G, through the pipe H to one side of the superheater. The steam then passes around the superheater, escaping through the pipe I to the other arm *g'* to the fitting G, then through the pipe K to the yoked fitting M, where the steam is divided, a portion going to the low pressure cylinders on one side of the locomotive, and the other portion going to the

low pressure cylinders on the opposite side 65 of the locomotive. The exhaust from the low pressure cylinders is carried to the smoke box in the ordinary manner common to this type of locomotive, in the present instance through the pipe C' to the nozzle 70 C² directly in the stack *d*³.

In some instances an opening may be made in the partition between the two passages of the fitting G and a valve *g*⁴ placed therein, as shown in Fig. 6 so that when it is desired to cut out the superheater the valved passage can be opened to allow the steam to pass directly from the high pressure to the low pressure cylinders without passing through the superheater. 80

I do not claim broadly a superheater mounted in the boiler structure of an articulated locomotive and flexibly connected to the cylinders, as this is set forth and claimed in an application for patent filed by Samuel M. Vauclain, on the twelfth day of December, 1908, under Serial No. 467,184. 85

I claim:—

1. The combination in an articulated locomotive of two frames pivotally connected, a boiler rigidly mounted on one frame and overhanging the other frame, high pressure cylinders on the frame to which the boiler is rigidly secured, low pressure cylinders on the other frame, a superheater in the smoke box of the boiler, a fitting having two passage-ways, a pipe connected to one end of the first passage-way and to the high pressure cylinders' exhaust ports, a pipe connected to the other end of the first passage-way and to one side of the superheater, a pipe connected to one end of the second passage-way and to the opposite side of the superheater, and a pipe made in sections connected to the other end of the second passage-way by a ball and socket joint and to the low pressure cylinders by a ball and socket joint, said sectional pipe having a telescopic joint interposed between the two ball and socket joints. 110

2. The combination in an articulated locomotive, of two frames pivotally connected, a boiler rigidly mounted on one frame and overhanging the other frame, high pressure cylinders on the frame on which the boiler is rigidly mounted, low pressure cylinders at the forward end of the other frame, a superheater in the smoke box of the boiler, a vertically arranged fitting having two passages therein and having two arms, one arm projecting on one side of the locomotive and the other on the opposite side, a pipe connecting one of said arms with one side of the superheater, a pipe connecting the other arm with the other side of the superheater, a cross pipe coupling the two exhaust ports of the high pressure cylinders with one of the said passages in the fitting, a yoked fit- 125

ting connected to the inlet passages of the low pressure cylinders, and a pipe connecting said yoked fitting with one of the passages of the first mentioned fitting, said
5 pipe having balls at each end adapted to sockets in the said fitting and having a telescopic section.

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

CHARLES A. DWINELL.

Witnesses:

J. H. KERST,
R. H. SANFORD.