G. F. WIESECKEL.

SIMPLE COMPOUND LOCOMOTIVE.

APPLICATION FILED FEB. 20, 1917.

1,237,987. Patented Aug. 21, 1917.

3 SHEETS—SHEET 1.

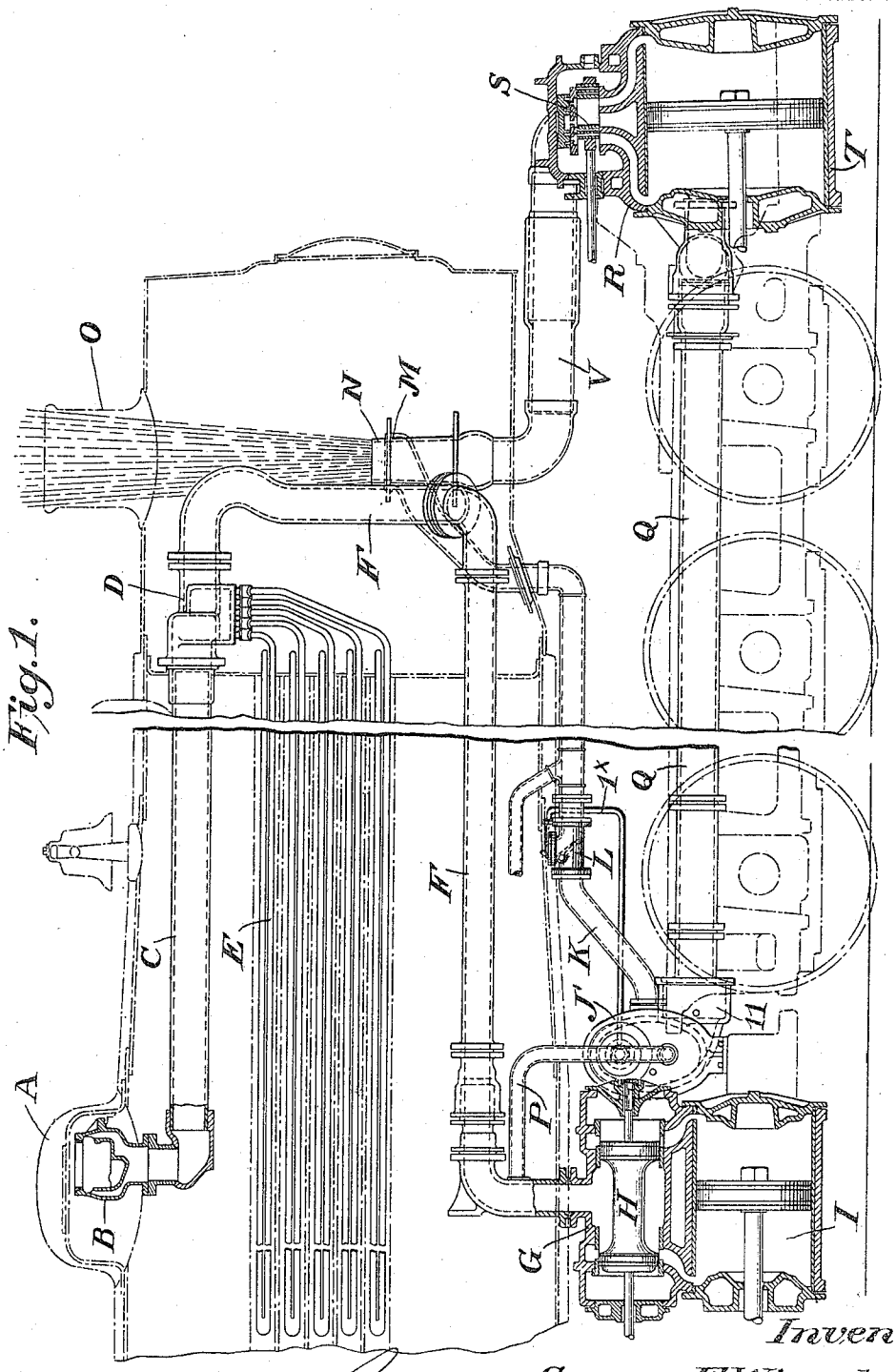

Fig. 1.

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3 SHEETS—SHEET 2.

Fig. 3.

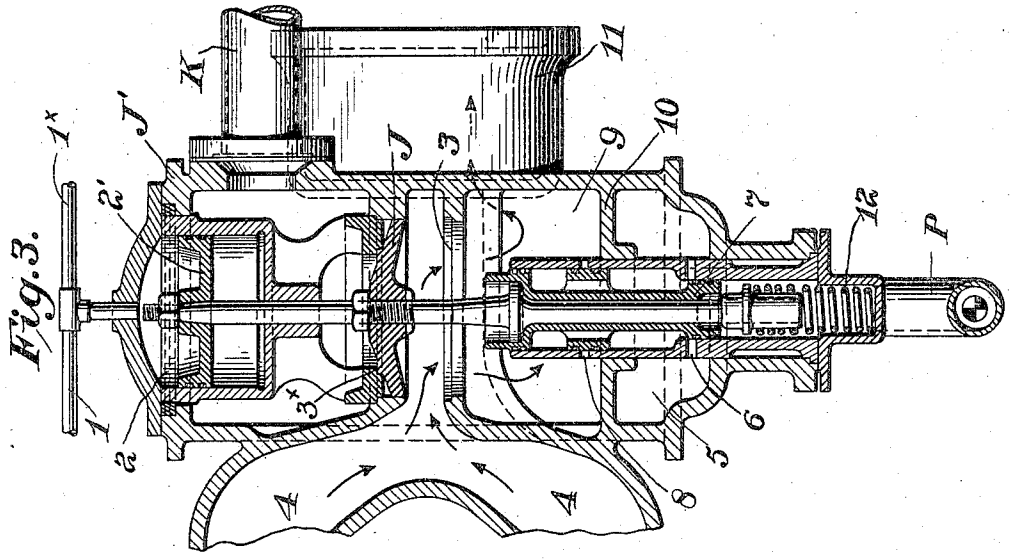
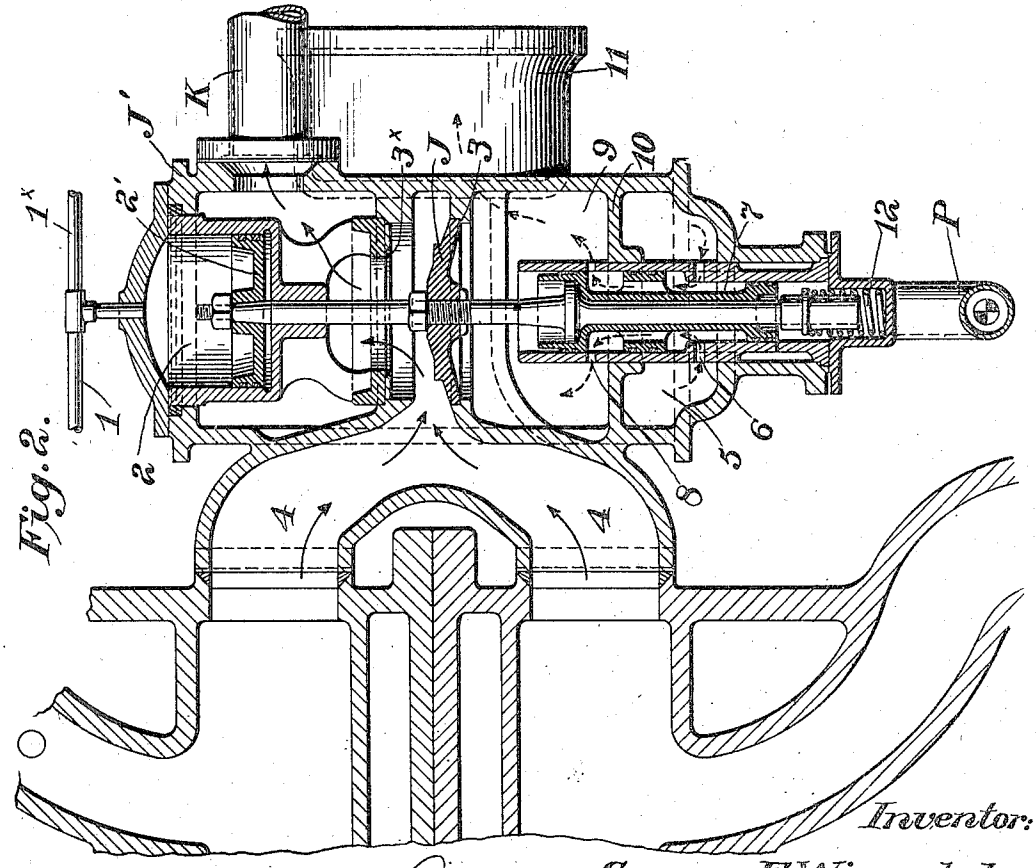


Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 4.

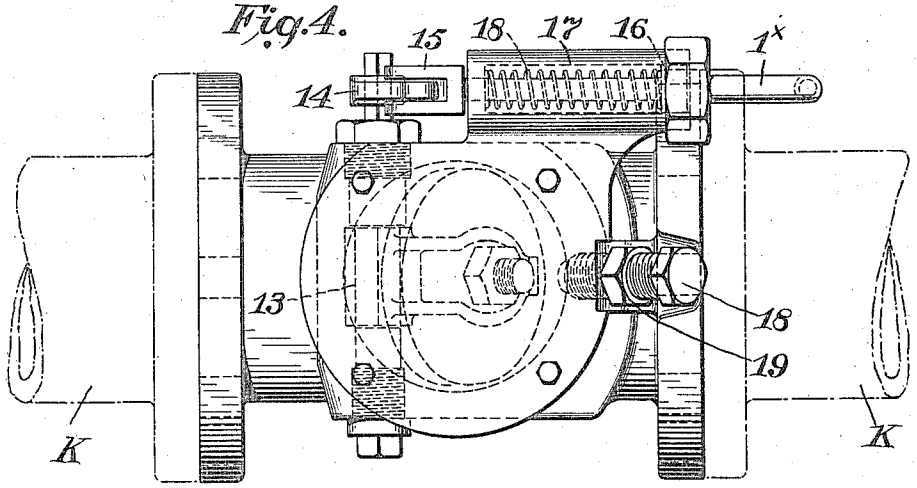
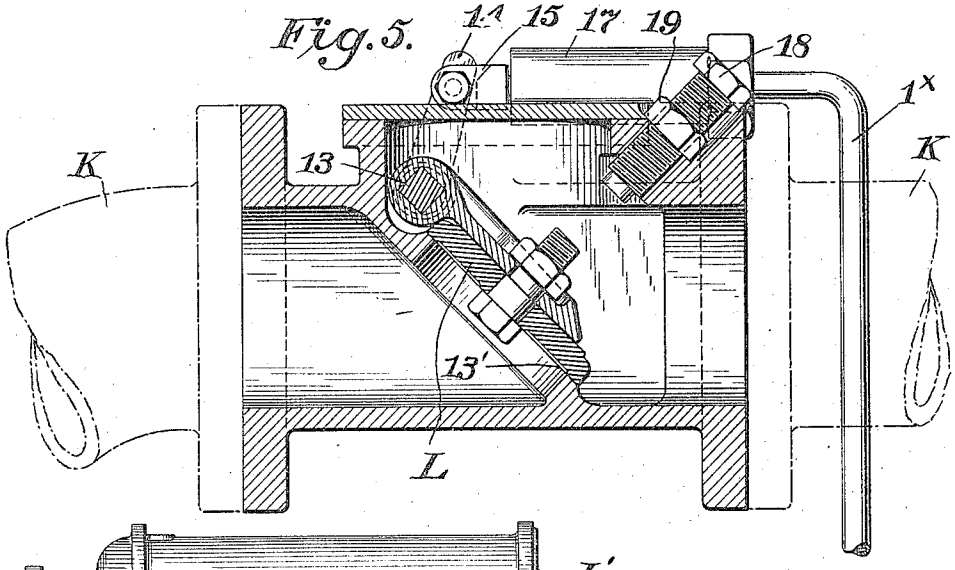


Fig. 5.



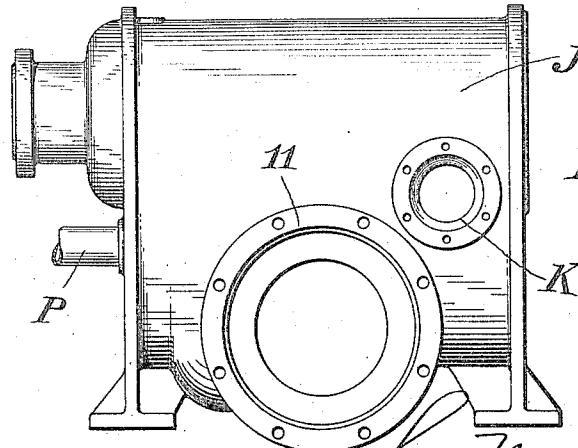


Fig. 3a

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UNITED STATES PATENT OFFICE.

GEORGE FRANK WIESECKEL, OF HAGERSTOWN, MARYLAND, ASSIGNOR OF ONE-HALF TO HARRY R. WARNOCK, OF HAGERSTOWN, MARYLAND.

SIMPLE-COMPOUND LOCOMOTIVE.

1,237,987. Specification of Letters Patent. Patented Aug. 21, 1917.

Application filed February 20, 1917. Serial No. 149,802.

To all whom it may concern:

Be it known that I, GEORGE F. WIESECKEL, a citizen of the United States, and resident of Hagerstown, Maryland, have invented certain new and useful Improvements in Simple-Compound Locomotives, of which the following is a specification.

The invention is an improvement in that type of locomotive known as the Mallet capable of operating either under the simple system or the compound system, my object being to provide means for preventing damage to the steam distribution valve of the low pressure cylinder when the engine is drifting, which, in ordinary practice is due to the lodgment of dust, cinders and combustion products in the steam chest of said cylinder because of the suction action of the low pressure piston drawing the foreign matter to this point.

In the drawings:

Figure 1 is a diagrammatic view of a locomotive boiler, high and low pressure cylinders and steam distribution system with my improvement shown in place on the emergency exhaust pipe of the system.

Fig. 2 is a horizontal sectional view of the intercepting valve in position for the operation of the locomotive under the simple system.

Fig. 3 is a similar view of said intercepting valve in position for compound operation of the locomotive.

Fig. 3ª is a side view of the intercepting valve casing.

Fig. 4 is a plan view of the check valve casing and associated parts.

Fig. 5 is a sectional view of the check casing and associated parts.

In operating the locomotive under the simple system steam from the dome A passes through the throttle B, dry pipe C, header D, superheater E and to the steam pipe F, thence to the chest G of piston valve H, which controls the steam supply to the pressure cylinder I. From this cylinder the steam exhausts through the end of the chest G, thence through the casing J′ of the intercepting valve J, and through the emergency or separate exhaust pipe K, past check valve L, which as will be pointed out hereinafter is the feature of my improvement, to the emergency or separate exhaust M consisting of a shell or casing surrounding the main exhaust N and from here the exhaust blows up through the stack O.

Live steam under full boiler pressure also passes from the high pressure steam pipe F through the branch pipe P to the intercepting valve chamber, this valve being in "simple" position from whence it passes as will be more particularly described hereinafter, direct to the receiver pipe Q, steam chest R, slide valve S, the low pressure cylinder T and exhaust V. This system of steam distribution is old and well known, and except for the check valve L and associated parts, the function of which will be described later, the elements described have been in use prior to my invention.

During the time that the locomotive is operating under the simple system, the intercepting valve J is in the position shown in Fig. 2, having been moved into this position by the engineer setting the "simple" valve (not shown) in the cab to supply steam through the pipe 1 to the chamber 2, where it acts on a piston 2′ and forces the intercepting valve to its seat 3, as shown in Fig. 2.

This permits the exhaust from the high pressure cylinders to pass by way of the passages 4—4 to the valve casing as shown by the full arrows to the separate or emergency exhaust pipe K, which directs it to the stack. The check valve L is held open during this time, for the free passage of the exhaust, by steam pressure delivered to controlling means at the check valve, this steam supply being delivered through the pipe 1^x, which is an extension of branch of the pipe 1.

The steam delivered through the branch pipe P in to the casing of the intercepting valve enters the chamber 5 and passes in through ports 6 of a slide valve 7 on the same stem with valve 3 and out through the ports 8 into the passage 9 on the opposite side of the partition 10, which divides passage 9 from the steam entrance chamber 5. This steam under full boiler pressure thence passes out through the discharge 11 of the intercepting valve casing into the receiver pipe Q and, as before stated, direct to the steam chest of the pressure cylinder. The

general course of the steam just described from pipe P to the receiver pipe Q is indicated by the dotted arrows in Fig. 2.

Compound system.

When the engineer desires to operate the locomotive under the compound system, instead of under the simple system, he manipulates the "simple" valve in the cab to release the steam pressure from pipe 1 and the piston chamber 2 of the intercepting valve mechanism and also from the pipe 1^x. As a result of releasing pressure from chamber 2 the intercepting valve will leave its seat 3 and seat itself at 3^x, thus closing the communication between the high pressure cylinder and the emergency exhaust pipe K and opening communication between the exhaust side of the high pressure cylinder and the space 9 of the intercepting valve, which as before stated, communicates through the discharge 11 of the intercepting valve casing with the receiver pipe Q, leading to the low pressure cylinder. The intercepting valve is seated at 3^x, because of the release of pressure from the chamber 2 and because of the pressure of spring 12.

During operation under the compound system the intercepting valve J will remain closed, as shown in Fig. 3, on its seat 3^x and steam exhausting from the high pressure cylinder will be delivered to the low pressure cylinder T.

If the engineer now allows the locomotive to drift, by cutting off steam at the throttle, a suction will be created in the emergency exhaust pipe K, under the practice existing prior to my invention, and dust, cinders and combustion products which have collected in this pipe during the compound working will be drawn through the intercepting valve casing, pipe Q to the steam chest of the low pressure cylinder, resulting in cutting of the valves and valve seat of the low pressure cylinders, which effect is augmented by the fact that the dust, cinders, &c., absorb the lubricant. To prevent this drawing back into the system of the dust, &c., from the stack the check valve L is provided. This is open during operation under the simple system, as above explained, but when the operation is changed to the compound system this check valve closes the emergency exhaust pipe K, this closing being due to the release of pressure from the pipe 1^x which takes place at the same time that pressure is released from pipe 1 and the intercepting valve is allowed to set itself in the compound position of Fig. 3.

It will be understood that the suction created by the piston of the low pressure cylinder, while drifting, produces suction in the emergency exhaust pipe, under prior practice, notwithstanding the fact that the intercepting valve J is closed on its seat 3^x because this valve being held under spring pressure will open and close as the low pressure piston reciprocates.

It will be observed further that the check valve is set in closed position at the time the system is changed by the engineer from simple to compound working but it is not called upon to prevent back pressure in the exhaust pipe K until the engineer cuts off steam at the throttle and allows the engine to drift.

The collection of dust in the emergency exhaust pipe during the compound working of the system is due to the fact that the discharge of steam through the main exhaust N is sufficiently strong to suck up cinders which have collected at the bottom of the chamber in which the exhaust is located and some of these cinders being drawn to the annular space between the main and emergency exhausts N and M will be deposited in the emergency exhaust pipe, and then when the engine is drifting, if no check valve were present, this collection of dust and cinders would be drawn back through the intercepting valve and the pipe Q to the valve casing of the low pressure cylinder due to the suction created by the low pressure piston. It may be asked why cinders will not pass back through the main exhaust pipe V, but it will be noted that such action cannot take place while the engine is working either under the simple or compound systems because the exhaust steam is passing out through this pipe under both of these systems of working and while the engine is drifting any back suction created through the said exhaust pipe V will not be sufficient to lift cinders up from the bottom of the chamber in which the main exhaust N is located and hence no cinders will be drawn directly into this pipe, but the suction created by the low pressure piston in drifting would be sufficient were the check valve L not present to draw dust and cinders, which had collected in the emergency exhaust pipe during compound working, back through the intercepting valve and the pipe Q into the low pressure engine.

It will be understood that with the check valve present cinders will collect in the emergency exhaust pipe beyond the check valve, that is between it and the emergency exhaust M but such cinders and dust will be blown out through the stack as soon as the operation of the engine under simple working is resumed.

The check valve is in the form of a flap valve pivotally mounted at 13 in its casing and closing upon an inclined seat 13′. Its pivot shaft has an arm 14 connected by a link or head 15 with the rod of a piston 16 in a cylinder 17, mounted on the casing. A spring 18 bearing on the piston tends to throw the valve onto its seat to close the emergency exhaust pipe and the pipe 1^x

supplies the steam pressure to the opposite side of the piston when the simple valve in the cab is set in simple position and thus the steam pressure acting in opposition to the spring will throw the valve to its open position for operation under the simple system.

When steam is released from the pipe 1 for changing the position of the intercepting valve for compound working the steam pressure is simultaneously released from the pipe 1^x and therefore from the cylinder 17 allowing the spring to close the valve and prevent suction back therethrough when steam is cut off at the throttle and the low pressure engine acts as a suction pump consequent upon the drifting of the engine.

An adjustable stop is provided at 18 against which the check valve strikes when it opens. This stop is screw-threaded and fits in a screw-threaded opening extending at the proper inclination through the valve casing to suit the incline of the valve. The stop is held by a nut 19. By removing this stop then a suitable implement may be introduced through the inclined opening to grind the valve seat.

Having thus fully described my invention what I claim is:

1. A locomotive engine comprising a high pressure cylinder, and a low pressure cylinder, an exhaust extending from the low-pressure cylinder, an emergency exhaust extending from the high pressure cylinder, and a connection to supply steam from the high to the low pressure cylinder, means for changing the engine from a simple to a compound system of operation and means for preventing the low pressure piston from drawing dust from the emergency exhaust of the high pressure cylinder into the steam chest of said low pressure cylinder when the engine is drifting, substantially as described.

2. A locomotive engine comprising a high pressure cylinder, and a low pressure cylinder, an exhaust extending from the low pressure cylinder, an emergency exhaust extending from the high pressure cylinders, and a connection to supply steam from the high to the low pressure cylinder, means for changing the engine from a simple to a compound system of operation and means for preventing the low pressure piston from drawing dust from the emergency exhaust of the high pressure cylinder into the steam chest of said low pressure cylinder when the engine is drifting, said means comprising a valve in the said emergency exhaust from the high pressure cylinder.

3. A locomotive engine comprising a high pressure cylinder and a low pressure cylinder, an exhaust extending from the low pressure cylinder, an emergency exhaust extending from the high pressure cylinder, and a connection to supply steam from the high to the low pressure cylinder, means for changing the engine from a simple to a compound system of operation and means for preventing the low pressure piston from drawing dust from the emergency exhaust of the high pressure cylinder, and through the supply port of and into the steam chest of said low pressure cylinder when the engine is drifting, said means comprising a valve in the emergency exhaust of the high pressure cylinder which is automatically operated for the simple operation of the locomotive and automatically closed when the system is changed from simple to compound working, substantially as described.

4. A locomotive engine comprising a high pressure cylinder and a low pressure cylinder, an exhaust extending from the low pressure cylinder, an emergency exhaust extending from the high pressure cylinder, and a connection to supply steam from the high to the low pressure cylinder, means for changing the engine from a simple to a compound system of operation and means for preventing the low pressure piston from drawing dust from the emergency exhaust of the high pressure cylinder and through the supply port of and into the steam chest of said low pressure cylinder when the engine is drifting, said means comprising a valve in the said emergency exhaust of the high pressure cylinder, with controlling means therefor operated by steam pressure when the working of the locomotive is changed from one system to the other.

5. A locomotive engine comprising a high and a low pressure cylinder, a connection for supplying steam from the exhaust of the high to the low pressure cylinder for compound working, an intercepting valve controlling said connection, means for supplying steam at full boiler pressure to the high pressure cylinder, and to the intercepting valve to be delivered therethrough to the low pressure cylinder for simple working, an emergency exhaust for the high pressure cylinder controlled by said intercepting valve, and automatically operating means for closing said emergency exhaust, when the system is changed from simple to compound working to prevent suction created by the low pressure piston when drifting from drawing cinders from said emergency exhaust into the steam chest of the low pressure cylinder, substantially as described.

6. A locomotive engine comprising a high and a low pressure cylinder, a connection for supplying steam from the exhaust of the high to the low pressure cylinder for compound working, an intercepting valve controlling said connection, means for supplying steam at full boiler pressure to the high pressure cylinder, and to the intercepting valve to be delivered therethrough to the low pressure cylinder for simple work-

ing, an emergency exhaust for the high pressure cylinder controlled by said intercepting valve, and automatically operating means closing toward the said intercepting valve for closing said emergency exhaust, when the system is changed from simple to compound working to prevent suction back through said emergency exhaust when the engine is drifting, said intercepting valve being controlled by steam pressure from the simple valve in the cab and said automatically operating emergency exhaust closer being simultaneously controlled by the same steam pressure, substantially as described.

7. In combination in a locomotive, a high and a low pressure cylinder with a connection between them to deliver exhaust steam from the high to the low pressure cylinder, an intercepting valve in said connection, an emergency exhaust pipe for the high pressure cylinder controlled by said intercepting valve to direct the exhaust steam to the stack, a steam supply for the low pressure cylinder controlled by the intercepting valve, a check valve in the emergency exhaust pipe closing toward the intercepting valve, and means for controlling said check valve to open it during simple operation of the locomotive and to close it during compound operation of the locomotive, substantially as described.

8. In combination in a locomotive, a high and a low pressure cylinder with a connection between them to deliver exhaust steam from the high to the low pressure cylinder, an intercepting valve in said connection, an emergency exhaust pipe for the high pressure cylinder controlled by said intercepting valve to direct the exhaust steam to the stack, a steam supply for the low pressure cylinder controlled by the intercepting valve, a check valve in the emergency exhaust pipe closing toward the intercepting valve, and means for controlling said check valve to open it during simple operation of the locomotive and to close it during compound operation of the locomotive, the said check valve controlled means and intercepting valve being operated by steam pressure simultaneously.

9. In combination a high pressure cylinder, a low pressure cylinder, exhaust pipes extending from each, running to the stack, an intercepting valve receiving the exhaust from the high pressure cylinder, a branch steam supply pipe leading to the intercepting valve, a pipe leading from the intercepting valve to the low pressure cylinder to supply either superheated steam or exhaust steam thereto, a connection for setting said valve in either simple position for supplying superheated steam to the low pressure cylinder or to compound position to supply exhaust steam thereto, and means operating simultaneously with said valve when set in compound position for closing the exhaust of the high pressure cylinder between the intercepting valve and the stack against the suction from the low pressure cylinder when the engine is drifting, substantially as described.

In testimony whereof, I affix my signature.

GEORGE FRANK WIESECKEL.