H. R. STAFFORD.

COMPOUND LOCOMOTIVE.

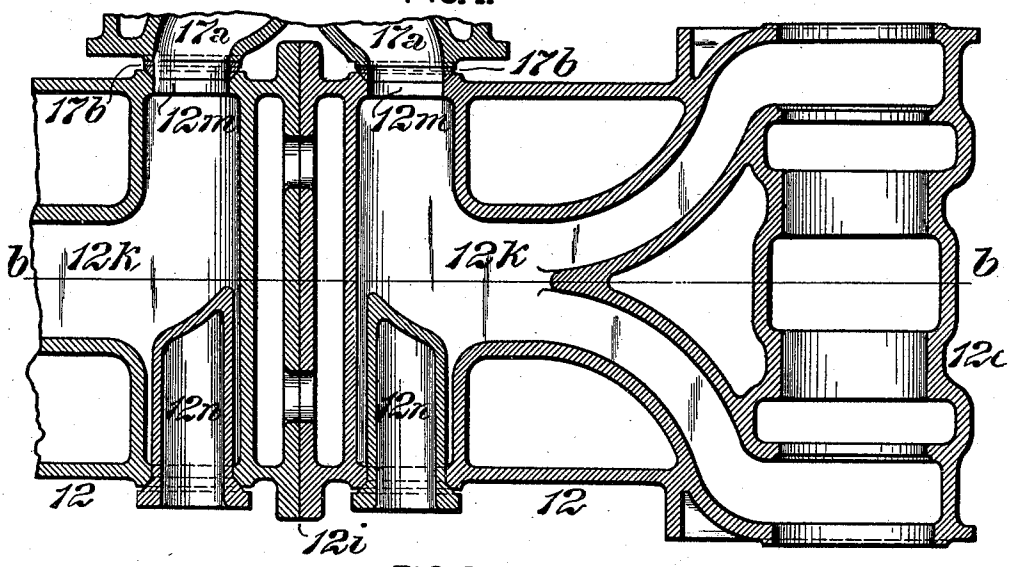
APPLICATION FILED FEB. 12, 1913.

1,066,334.

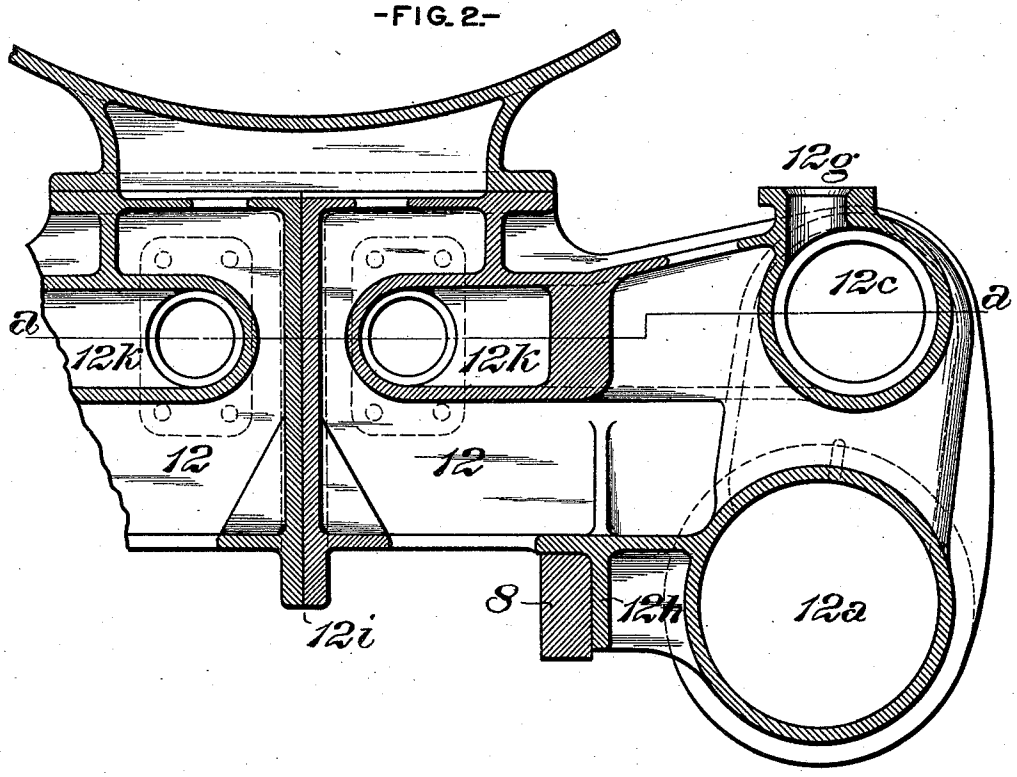
Patented July 1, 1913.

2 SHEETS—SHEET 1.

-FIG. 1.-



-FIG. 2.-



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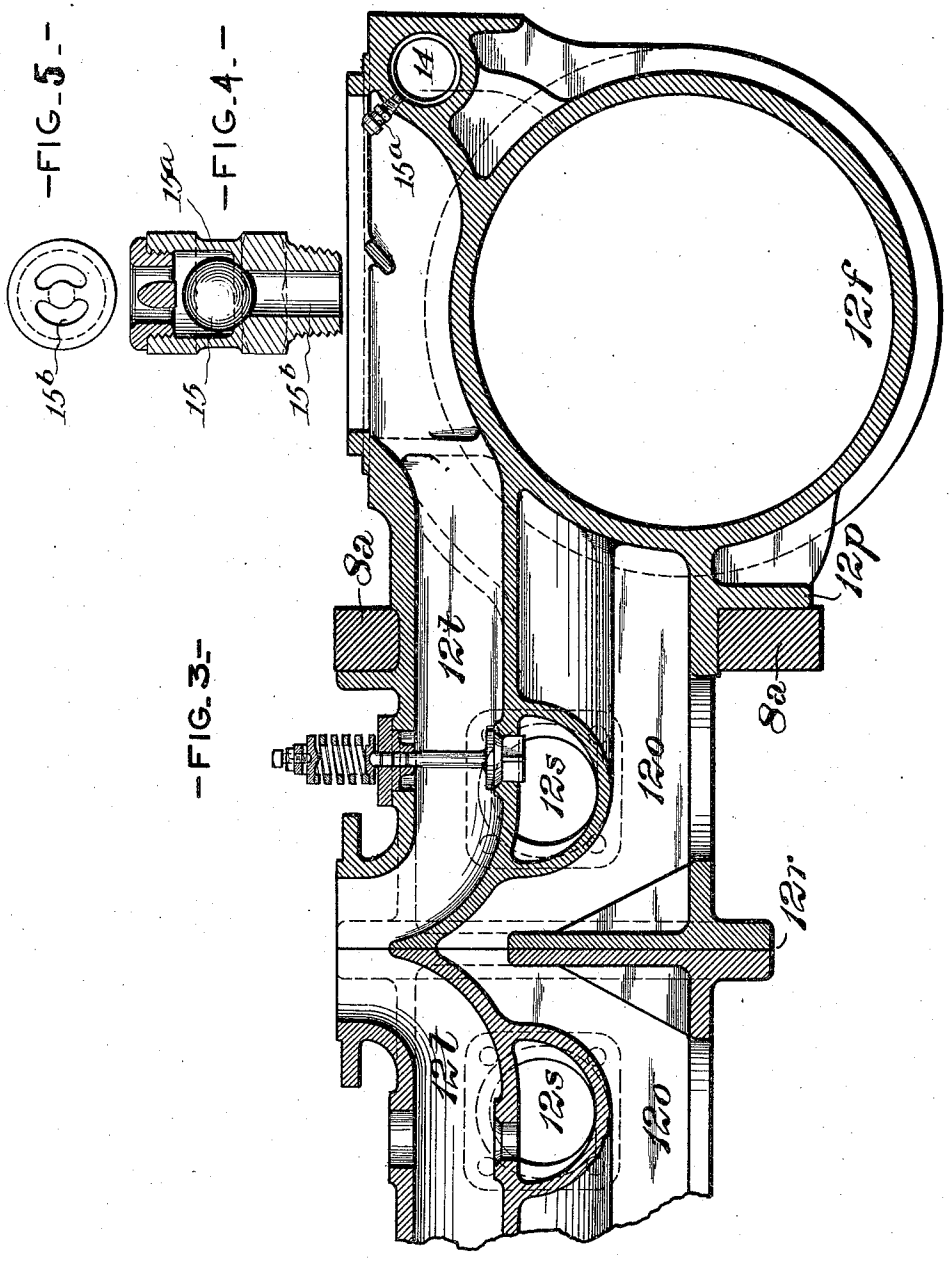
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UNITED STATES PATENT OFFICE.

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COMPOUND LOCOMOTIVE.

1,066,334. Specification of Letters Patent. Patented July 1, 1913.

Original application filed December 7, 1912, Serial No. 735,453. Divided and this application filed February 12, 1913. Serial No. 747,926.

To all whom it may concern:

Be it known that I, HAL R. STAFFORD, of Schenectady, in the county of Schenectady and State of New York, have invented a certain new and useful Improvement in Compound Locomotives, of which improvement the following is a specification.

My invention, while more particularly designed for application in compound locomotives of the articulated or "Mallet" type, is adaptable, similarly and with equally advantageous results, in those of the "cross compound" type, and its objects are to effect a general simplification of structures, and effect a reduction of the undue and objectionable steam leakages which are ordinarily experienced by providing for the conveyance of the various vents, drains, and relief passages to the exhaust passage and thence to the stack, and by effecting a reduction in the number of steam joints and the provision of such a construction of those that cannot be eliminated, as will enable them to be readily maintained in proper operative condition.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings: Figure 1 is a horizontal section through a high pressure distribution valve chest and its exhaust passages, of a compound locomotive embodying my invention, on the line *a a* of Fig. 2; Fig. 2, a vertical transverse section through a high pressure cylinder and its valve chest, on the line *b b* of Fig. 1; Fig. 3, a similar section through one of the low pressure cylinders; Fig. 4, a longitudinal central section, on an enlarged scale, through a by-pass vent valve; and, Fig. 5, an end view of the same.

Referring to the drawings, in the practice of my invention, I provide two counterpart high pressure cylinders, 12^a, each of which is cast integral with a valve chest, 12^c, located on its top, and a helf saddle, 12, extending from the cylinder and valve chest to the longitudinal central plane of the locomotive. A nozzle, 12^g, is formed on the top of each of the valve chests, 12^c, which are, in this instance, shown as designed for the reception of inside admission piston valves, although they may obviously be adapted for use with any other desired construction of distribution valves. Flanges 12^h, are formed on the half saddles, 12, for connection to the side members of the rear frame, 8, and the inner vertical faces of the half saddles, which are finished truly, abut in the longitudinal central plane of the locomotive, the half saddles being connected by bolts passing through flanges, 12^i, in the ordinary manner.

In locomotives of the articulated compound type, as constructed prior to my invention, it has ordinarily been the practice to form the chamber or casing of the intercepting valve mechanism, integral with one of the high pressure cylinder half saddles. This practice is objectionable in the particulars of involving the necessity of making right and left hand cylinder castings, which are complicated and expensive to mold, and cause a considerable loss when a casting proves defective, and of the integral intercepting valve chambers being more inconvenient and expensive to bore out than if made in a smaller separate casting. These objections are obviated under my invention, by providing two interchangeable high pressure cylinders, neither of which contains an intercepting valve chamber, and forming said chamber in a separate casting. To this end, the exhaust passage, 12^k, of each high pressure cylinder, extends transversely in the half saddle, 12, from the valve chest, 12^c, nearly to the inner wall of the half saddle, and thence extends longitudinally to the front and the rear walls thereof, in which it terminates by nozzles or openings, 12^m, adapted for connection to the outer ends of the exhaust passage, 17^a, of a separate intercepting and direct exhaust valve chamber, ball joint rings, 17^b, being interposed at the joints, to insure tightness while permitting a limited degree of relative movement. In this, as in all other particulars, the two high pressure cylinders are counterparts and interchangeable, and therefore either end of the half saddles may be connected to the intercepting valve chamber. As shown in Fig. 1, the openings, 12^m, opposite those to which the intercepting valve chamber is connected, are closed by plugs, 12^n, the inner ends of which are curved in conformity with the curvature of the turn of the exhaust passage toward the intercepting valve chamber. While the exhaust passage, 12^k, is shown in Fig. 1, as bifurcated and leading to opposite ends of the valve chests, it will be obvious

that such bifurcation is merely incidental to the employment of an inside admission piston distribution valve, for the application of which, the construction shown is designed, and that if an outside admission valve is used, the exhaust passage will extend in the plane of the line, *b b*, to the valve chest.

The low pressure cylinders, 12^f, are each cast integral with a half saddle, 12^o, the half saddles having flanges, 12^p, through which they are bolted to the rails of the front frame, 8^a, of the locomotive, and being secured together in the central longitudinal plane of the locomotive by bolts passing through flanges, 12^r. The low pressure cylinders are, similarly to the high pressure cylinders, duplicates and interchangeable, and steam passages, 12^s, communicating with one of the branches of a receiver pipe, and leading to the ends of the low pressure valve chests, 12^b, are formed in the half saddles, as are also exhaust passages, 12^t, leading from the valve chests to a connection with the ordinary exhaust pipe in the smoke box.

In order to prevent the discharge of steam from the passage, 14, between the ordinary by-pass valves, when such valves are applied, as is frequently the case, a vent valve, 15, is fitted in a cage or chest, 15^a, secured in the wall of the exhaust passage, 12^t, said valve controlling a vent opening, 15^b, leading through the cage, from the passage, 14, to the exhaust passage, and seating normally in the direction of the passage, 14. The vent valve which is herein shown, is of the ball type, but may be of any other suitable and preferred construction, and by its application, the discharge of steam is effected through the exhaust pipe and stack, and gases from the front end, which would gum up the by-pass valve seats, are prevented from being drawn in from the exhaust passage.

The construction herein described is shown and described, but not claimed, in an application filed by me, December 7, 1912, Ser. No. 735,453, of which this application is a division.

I claim as my invention and desire to secure by Letters Patent:

1. In a compound engine, a high pressure cylinder having an integral valve chest and half saddle and an exhaust passage extending directly from its valve chest to an opening in an end wall of its half saddle.

2. In a compound engine, a high pressure cylinder having an integral valve chest and half saddle and an exhaust passage extending directly from its valve chest to opposite openings in the end walls of its half saddle.

3. In a compound engine, the combination of a high pressure cylinder having an integral valve chest and half saddle and an exhause passage extending directly from its valve chest and turned in opposite directions to openings in the end walls of its half saddle, and a plug closing one of said openings, and having its inner end curved in the direction of curvature of the opposite turn of the exhaust passage.

4. In a compound engine, the combination of two counterpart high pressure cylinders, each having an integral valve chest and half saddle and an exhaust passage terminating at one end of the half saddle, and an intercepting valve mechanism casing connected to the half saddles and having exhaust passages communicating with the exhaust passages thereof.

5. In a compound engine, the combination of two high pressure cylinders, each having an integral valve chest and half saddle and an exhaust passage extending directly from its valve chest and turned in opposite directions to openings in the end walls of its half saddle, an intercepting valve mechanism casing connected to the half saddles and having exhaust passages communicating with the exhaust passages thereof, and plugs closing the openings of the half saddles further from said casing and having their inner ends curved in the direction of curvature of the exhaust passages toward said casing.

6. In a compound engine, the combination of a cylinder having a by-pass passage for establishing communication between its opposite ends, a valve chamber fixed in the wall of said passage, and a valve working in said chamber and controlling communication between said passage and the exhaust passage of the cylinder.

7. In a compound engine, the combination of a cylinder having a by-pass passage for establishing communication between its opposite ends, a valve chamber fixed in the wall of said passage, and a valve seating by gravity in said chamber and exposed to pressure in said passage in direction to be unseated, said valve controlling communication, through said chamber, between said passage and the exhaust passage of the cylinder.

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Witnesses:
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."