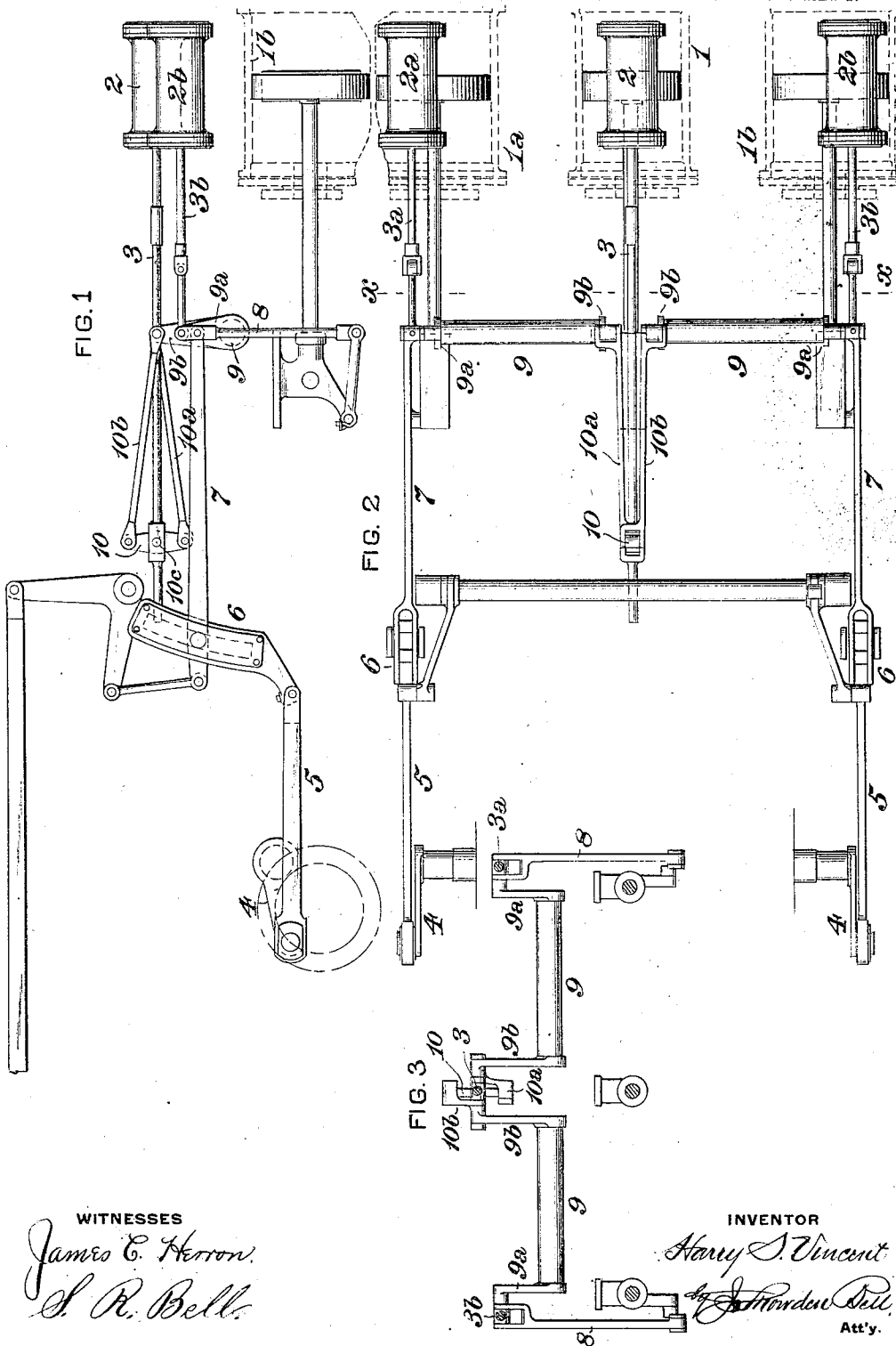


946,083.

H. S. VINCENT.
VALVE GEAR.
APPLICATION FILED JULY 24, 1909.

Patented Jan. 11, 1910.

2 SHEETS—SHEET 1.



WITNESSES
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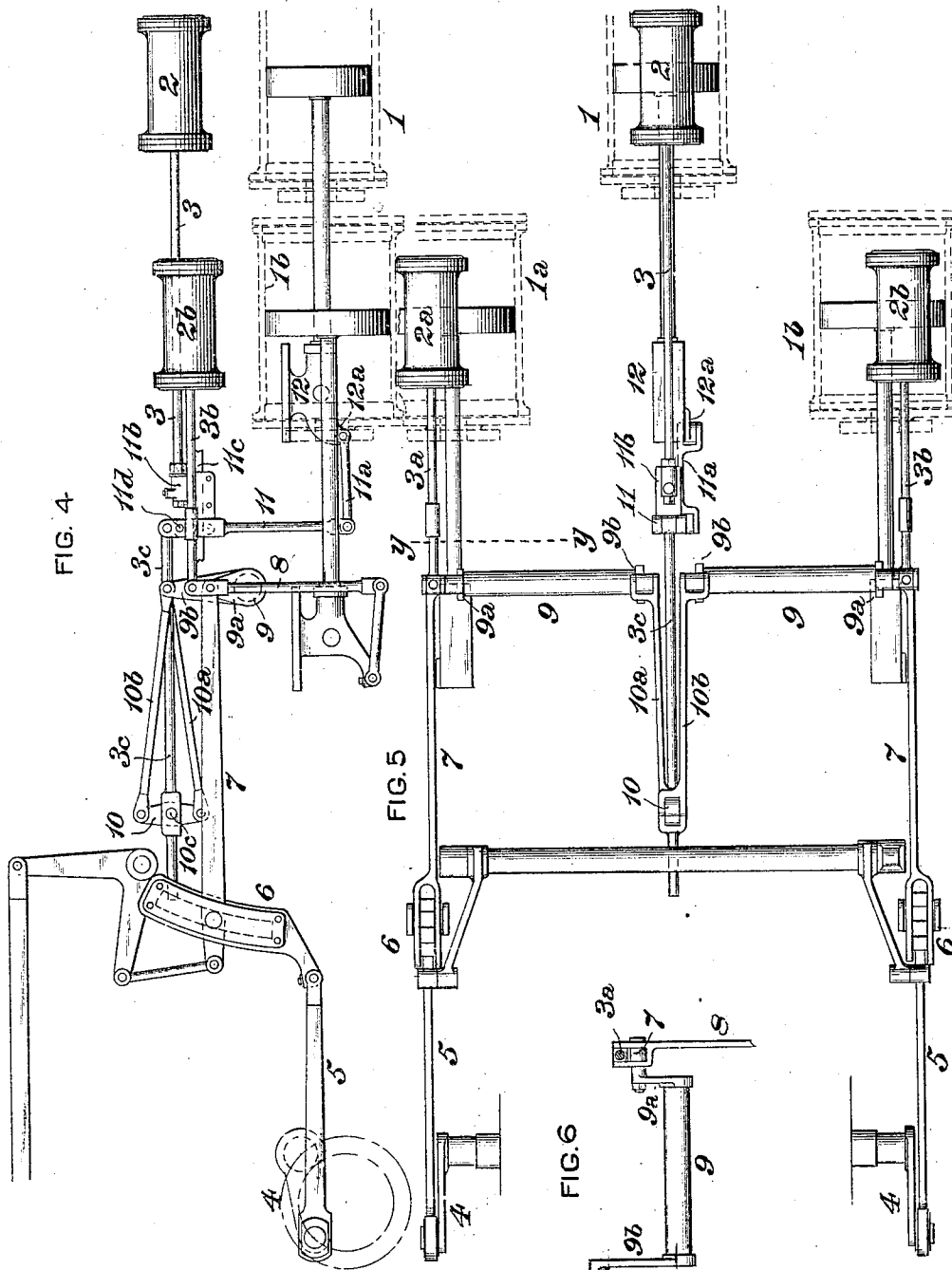
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WITNESSES

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UNITED STATES PATENT OFFICE.

HARRY S. VINCENT, OF RIDGEWOOD, NEW JERSEY.

VALVE-GEAR.

946,083.

Specification of Letters Patent. Patented Jan. 11, 1910.

Application filed July 24, 1909. Serial No. 509,280.

To all whom it may concern:

Be it known that I, HARRY S. VINCENT, of Ridgewood, in the county of Bergen and State of New Jersey, have invented a certain new and useful Improvement in Valve-Gears, of which improvement the following is a specification.

My present invention, which relates to valve gears for three cylinder fluid pressure engines, is applicable to all engines having three cylinders the fluid utilizing functions of which are effected by valves of the reciprocating type, and is especially adaptable to locomotive engines, either those in which all three cylinders are of the single expansion type, or those of the stage expansion or compound type.

The object of my invention is to provide simple and efficient means for actuating the distribution valve of the central cylinder of a three cylinder engine, without the use of an independent valve gear operated by the driving axle or connecting rod, such as has heretofore been employed, said means being capable of effecting either practically the same distribution of the motive fluid in all three of the cylinders, or a dissimilar distribution therein.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings: Figure 1 is a side view, in elevation, of the valve gear of a three cylinder locomotive, illustrating an application of my invention as adapted to effect similar distribution of motive fluid in all three of the cylinders; Fig. 2, a plan or top view of the same; Fig. 3, a transverse section, on the line *x x* of Fig. 2; Fig. 4, a side view, in elevation, of the valve gear of a three cylinder locomotive, illustrating a structural modification of my invention as adapted to effect dissimilar distribution of motive fluid within the cylinders of a stage expansion engine, as by relatively varying the cut off in the high and low pressure cylinders; Fig. 5, a plan or top view of the same; and, Fig. 6, a transverse section, on the line *y y* of Fig. 5.

Referring first to Figs. 1 to 3 inclusive, my invention is herein exemplified as applied in a three cylinder single expansion locomotive engine, having a central cylinder, 1, and two side cylinders, 1^a, 1^b, in which the distribution valves, 2^a, 2^b, of the outer cylinders, 1^a, 1^b, are operated by ordinary Walschaert valve gears, each of which com-

prises a return crank, 4, eccentric rod, 5, link, 6, radius bar, 7, and lap and lead lever, 8, to which valve gears, the valve stems, 3^a, 3^b, of the valves, 2^a, 2^b, are connected in the usual manner. The distribution valve, 2, of the central cylinder, 1, is actuated through means provided by my invention, which will now be described. In the ordinary operation of the locomotive, reciprocating movement is imparted, through the Walschaert valve gears above specified, to the valve stems, 3^a, 3^b, and connected distribution valves, 2^a, 2^b, of the outer cylinders, 1^a, 1^b. Two transverse rocker shafts, 9, 9, are journaled in suitable bearings, in line axially one with the other, below the valve stems, said shafts carrying, on their outer ends, rocker arms, 9^a, to which the outer valve stems, 3^a, 3^b, are coupled, and to which the radius rods, 7, of the Walschaert gears of the two outer cylinders are also coupled. The inner ends of the shafts, 9, 9, have fixed upon them, rocker arms, 9^b, of greater length than the arms 9^a, and said arms, 9^b, are coupled, by links 10^a, 10^b, to the opposite arms of a double armed selector lever, 10, pivoted centrally, by a pin, 10^c, to the stem, 3, of the distribution valve of the central cylinder, 1. The selector lever, through the combined action upon it of the valve gears of the two outer cylinders, imparts to the valve stem, 3, and connected distribution valve 2, a reciprocating movement, proportioned by the greater length of the arms, 9^b, which is analogous to that which would be derived from an independent valve gear operated from a driving axle or connecting rod, which independent valve gear is, under my invention as above described, wholly dispensed with.

Figs. 4 to 6 inclusive, illustrate a structural modification of my invention, in which, as in the construction first described, the distribution valve of the central cylinder, 1, is actuated without the use of an independent valve gear, and which, further, embodies the capability of effecting distribution in the central cylinder dissimilar to that in the outer cylinders, as may be desired in a stage expansion engine. In the instance shown, the distribution valves, 2^a, 2^b, of the outer low pressure cylinders, 1^a, 1^b, are actuated by Walschaert valve gears similar to those before described, and the distribution valve, 2, of the central high pressure cylinder, 1, is actuated through the intermediation of

transverse rocker shafts, 9, 9, carrying rocker arms, 9^a, 9^b, and a double armed selector lever, 10, coupled to the rocker arms, 9^b, by links, 10^a, 10^b, also substantially as before described. In this instance, the motion imparted to the selector lever, 10, instead of being communicated directly to the stem, 3, of the distribution valve of the central high pressure cylinder, 1, as before described, is imparted thereto through a rod, 3^c, to which the selector lever is pivoted centrally, said rod being coupled, at its end farther from the selector lever, to a combination lever, 11, the opposite end of which is coupled, by a link, 11^a, to an arm, 12^a, on the cross head, 12, of the central cylinder, 1. The resultant of the motion imparted to the upper and lower ends of the combination lever, effects the reciprocation of the distribution valve, 2, of the central cylinder, through a sliding block, 11^b, fixed to the stem, 3, of said valve, the block, 11^b, working on a fixed guide, 11^c, and being coupled to the combination lever, 11, by a pin 11^d.

It will be obvious to those skilled in the art that the selector lever, 10, may, without departure from the spirit and operative principle of my invention, be located either vertically, horizontally, or at any convenient angle, and that it may, if preferred, be connected directly to reciprocating members of the valve gears which operate the distribution valves of the two outer cylinders, without the interposition of the links 10^a, 10^b.

It will be further obvious that my invention is not limited in application to engines in which the distribution valves of the outer cylinders are actuated by the specific type of valve gear herein selected for illustration, as the Stephenson link motion, or any other known type of valve gear, may be used without variation of operative principle.

The practical advantage of my invention, in enabling the cost of construction and maintenance of the independent valve gear heretofore employed for actuating the distribution valve of the central cylinder, to be dispensed with, will be apparent to constructors and operators of locomotive engines.

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

1. In a three cylinder fluid pressure engine having one central and two side cylinders, the combination of two valve operating mechanisms, each actuating the distribution valve of one of the side cylinders independently of that of the other, and means for imparting the resultant of the independent

movements of said valve mechanisms to the distribution valve of the central cylinder.

2. In a three cylinder fluid pressure engine having one central and two side cylinders, the combination of two valve operating mechanisms, each actuating the distribution valve of one of the side cylinders independently of that of the other, and lever and link connections through which the resultant of the independent movements of said valve mechanisms is transmitted to the distribution valve of the central cylinder.

3. In a three cylinder fluid pressure engine having one central and two side cylinders, the combination of two valve operating mechanisms, each actuating the distribution valve of one of the side cylinders, a double armed selector lever pivoted centrally to a stem connected with the distribution valve of the central cylinder, and connections coupling the ends of said selector lever with the valve operating mechanisms.

4. In a three cylinder fluid pressure engine having one central and two side cylinders, the combination of two valve operating mechanisms, each actuating the distribution valve of one of the side cylinders, a double armed selector lever pivoted centrally to a stem connected with the distribution valve of the central cylinder, two rocker shafts journaled in line axially, rocker arms fixed on said rocker shafts and coupled to the valve operating mechanisms, and rocker arms, of greater length, fixed on said rocker shafts and coupled to the selector lever.

5. In a three cylinder fluid pressure engine having one central and two side cylinders, the combination of two valve operating mechanisms, each actuating the distribution valve of one of the side cylinders, a double armed selector lever pivoted centrally to a rod or stem, two rocker shafts journaled in line axially, rocker arms fixed on said rocker shafts and coupled to the valve operating mechanisms, rocker arms, of greater length, fixed on said rocker shafts and coupled to the selector lever, a cross head fixed on the piston rod of the central cylinder, a combination lever coupled at its opposite ends to said cross head and to the stem of the selector lever, respectively, and connections coupling said combination lever, between its ends, to the distribution valve stem of the central cylinder.

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Witnesses:

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