G. W. DILLEHAY.

LOCOMOTIVE.

APPLICATION FILED JULY 15, 1908.

917,559.

Patented Apr. 6, 1909.

2 SHEETS—SHEET 1.

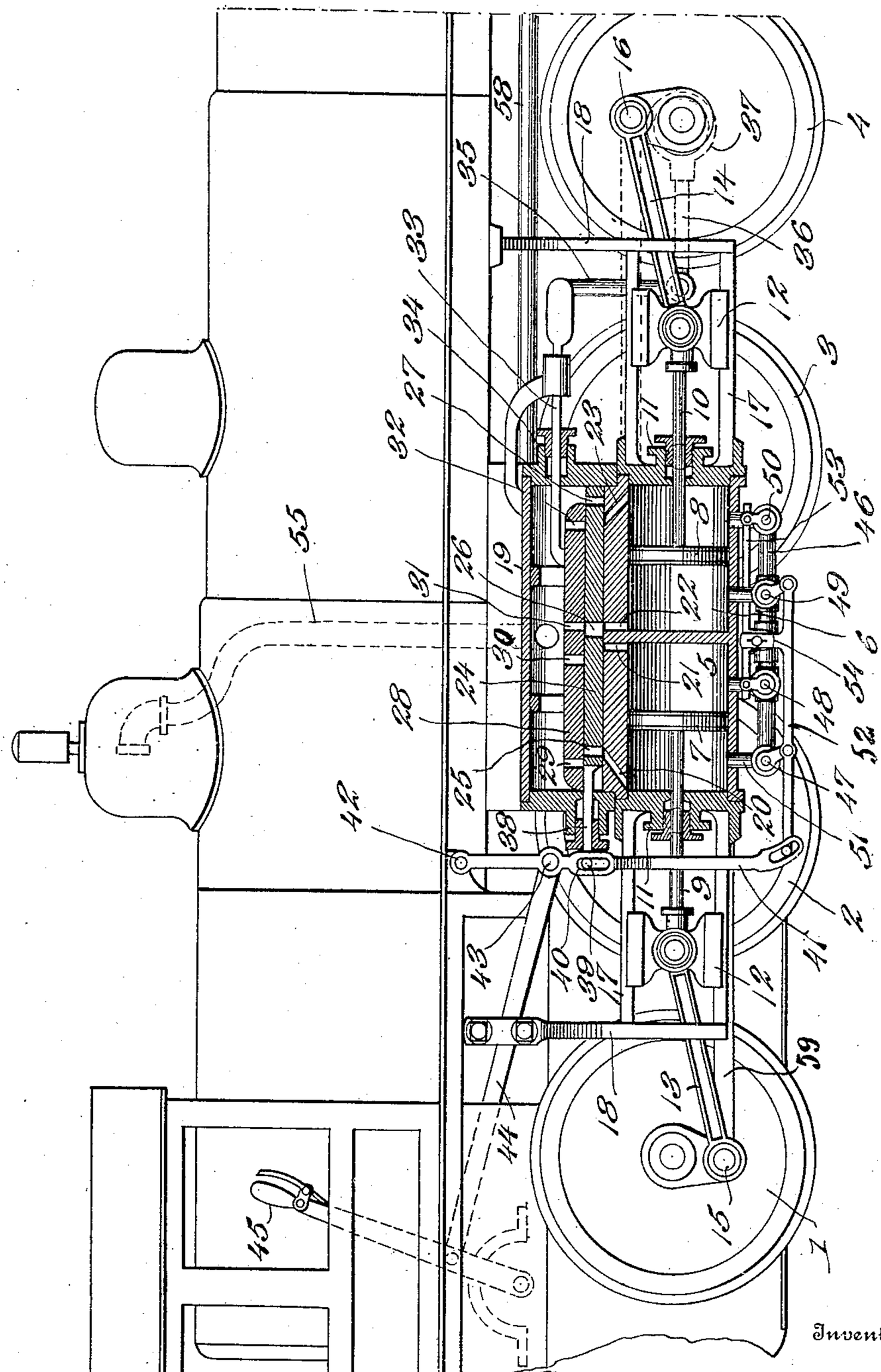

Fig. 1.

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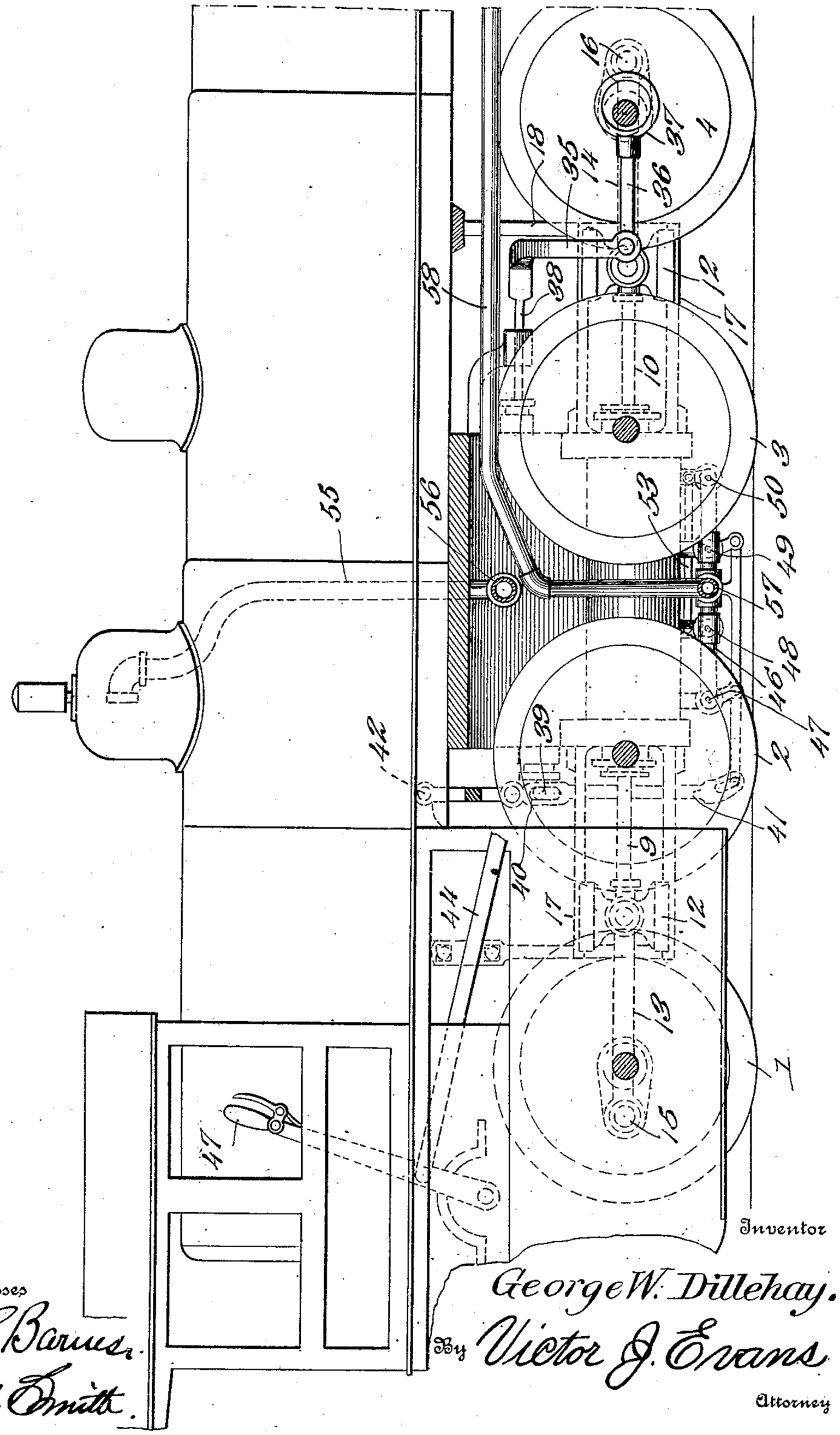
2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

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LOCOMOTIVE.

No. 917,559. Specification of Letters Patent. Patented April 6, 1909.

Application filed July 15, 1908. Serial No. 443,722.

To all whom it may concern:

Be it known that I, GEORGE W. DILLEHAY, a citizen of the United States, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented new and useful Improvements in Locomotives, of which the following is a specification.

This invention relates to locomotives, the object of the invention being to provide a novel arrangement of pistons and cylinder, together with valves controlling the admission of steam to the cylinders and a special arrangement of connecting rods and driving wheels, whereby the full power of the cylinders is applied to the drive wheels of the engine at the most advantageous points in the movements thereof, whereby the engine, as a whole, is adapted to perform the same amount of work with a more economical consumption of fuel or to perform more work with the same quantity of fuel as compared with the ordinary locomotive at present in use.

The improvement also renders the locomotive easy and smooth running and provides for a steady application of power at all times to the drive wheels, thereby overcoming dead centers and enabling the engine to be started forward or backward irrespective of the positions of the pistons and connecting rods.

With the above general objects in view, the nature of which will more fully appear as the description proceeds, the invention consists in the novel construction, combination and arrangements of parts as herein fully described, illustrated and claimed.

In the accompanying drawings:—Figure 1 is a side elevation of a locomotive, partly in section, showing the improvements applied thereto. Fig. 2 is a similar view, omitting the cylinder and pistons, and showing a part of the frame of the engine broken away in sections.

Referring to the drawings, 1, 2, 3 and 4 designate the drive wheels of the engine at one side thereof, it being understood that eight drive wheels in all are used, four on each side. In connection with each set consisting of four drive wheels, a double cylinder is employed, or in other words, two cylinders designated at 5 and 6 and in each of said cylinders there is arranged a piston head 7 and 8 from which connecting rods 9 and 10 extend in opposite directions to stuffing boxes 11 and connecting with sliding cross heads 12 from which connecting rods 13 and 14 extend to the crank pins 15 and 16 of the forward and rear driving wheels of the set. The cross heads 12 move back and forth in suitable guides 17 as shown in Fig. 1 which guides are supported from the frame of the machine by means of brackets 18.

Above the cylinders 5 and 6 there is arranged a steam chest 19, the lower wall of which is provided with steam ports 20, 21, 22 and 23, leading to opposite sides of the pistons 7 and 8. Just over the wall provided with the ports referred to there is arranged a hand-operated reversing slide valve 24 provided with ports 25, 26 and 27 adapted to register at different times with ports 20 to 23 inclusive, above referred to.

Arranged over the slide valve 24 is an eccentric operated slide valve 28 provided with ports 29, 30, 31 and 32, said valve 28 having a stem 33 which passes through a stuffing box 34 and has the end thereof extended downward, as shown at 35, and connected to an eccentric rod 36 having an eccentric strap 37 which embraces an eccentric on the axle of the forward driver 4, as shown in the drawings.

The hand-operated valve 24 is provided with a stem 38 the end of which is provided with a pin 39 which is received in a slot 40 in a yoke lever 41 fulcrumed at its upper end of the locomotive frame, as shown at 42 having connected pivotally therewith at 43 a connecting rod 44 which extends back to a hand lever 45 preferably arranged in the engine cab within easy reach of the engineer who by operating said lever may shift the valve 24 and reverse the order of the ports leading to the cylinders so that the ports which previously acted as inlet ports then become exhaust ports while the previous exhaust port becomes the steam inlet port.

Extending parallel with the cylinders is an exhaust pipe 46 provided with four valves 47, 48, 49 and 50, which valves control the exhaust connections 51 leading from the cylinder to the pipe 46. The valves 47 and 49 are connected to a yoke bar 52 which is in turn connected by a pin-and-slot engagement to the lower end of the yoke lever 41, whereby both of said valves are simultaneously opened and closed. The other valves 48 and 50 are connected to

another yoke bar 53 which is in turn connected to an arm or lateral extension 54 of the first named yoke bar 52. By the arrangement described, as the valves of two of the exhaust connections are opened, the valves of the other connections are closed and vice versa, and by reason of the fact that said yoke bars are connected to the yoke lever 41 and also the hand-operated reversing valve 24, it will be observed that when the steam inlet valve 24 is reversed, the exhaust valves will be correspondingly reversed with the result that steam will be admitted to opposite sides of the cylinder heads and exhausted in a corresponding manner. It will further be observed that the connecting rod 13 inclines downward during the return or inactive stroke of the piston head 7 while the connecting rod 14 inclines upward during the active stroke of the piston head 8. Under the arrangement described in the active stroke of the pistons, the connecting rods thereof all operate above the axle of the wheel thus utilizing the active stroke of the piston while the point or connection between the connecting rod and the drive wheel is passing over the center of its axial movement. The adjacent wheels are also connected in pairs by other connecting rods 59 which insure the preservation of the relative arrangement just described.

55 designates the steam inlet pipe which leads from the dome of the boiler to a branch cross pipe 56, the latter leading in opposite directions to the two steam chests. The exhaust passes from the oppositely located pipes 46 through a common connecting cross pipe 57 to a common exhaust pipe 58 leading to the smoke stack or other desired point of exhaust.

From the foregoing description it will be observed that there can be no dead centers in the operation of the engine and that the whole power of the expansion of the steam is applied to the drive wheels at points above the axles of said wheels. Also by reason of the fact that the connecting rods are arranged to operate alternately, one of said rods at each side of the engine is reversed in its power stroke above the axle of the respective drive wheel. This gives a steady application of power to the drive wheels of the engine and enables the same to be run more economically as compared with the ordinary locomotive engine at present in common use.

I claim:—

1. A locomotive comprising cylinders at each side thereof, each cylinder embodying two independent expansion chambers, two sets of driving wheels at each side of the locomotive, connecting rods interposed between the pistons of said expansion chambers and the sets of driving wheels, other connecting rods connecting the wheels in pairs, a steam chest for each pair of cylinders, a hand-operated reversing valve on each steam chest, an exhaust valve for each cylinder, two sets of exhaust valves affording communication between said exhaust pipes and the expansion chambers, and a hand-operated yoke lever connected with the inlet and exhaust valves whereby the shifting of the inlet valves will simultaneously cause a corresponding shifting of the exhaust valves.

2. A locomotive comprising cylinders arranged at opposite sides thereof and each embodying two expansion chambers arranged end-to-end and separated by an intervening partition, pistons mounted in said expansion chambers, two independent sets of drive wheels at each side of the locomotive, connecting rods interposed between said pistons and drive wheels, other connecting rods connecting said wheels in pairs, a hand-operated reversing inlet slide valve, a plurality of exhaust valves, a yoke lever operatively connected with both the reversing valve and the exhaust valves, and a hand lever for shifting said yoke lever.

In testimony whereof I affix my signature in presence of two witnesses.

GEO. W. DILLEHAY.

Witnesses:
L. W. SLOAN,
EMMETT MCDERMATT.