G. W. BAKER.

ENGINE.

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999,143.

Patented July 25, 1911.

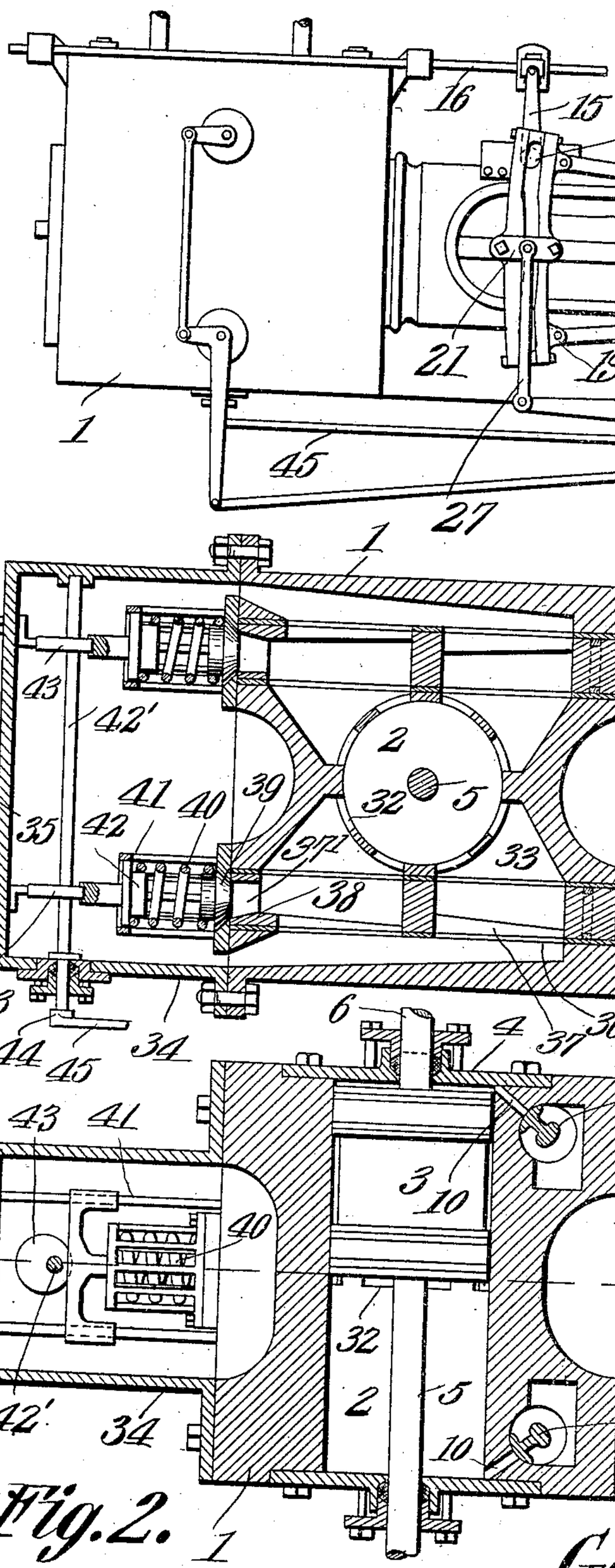

Fig. 1.

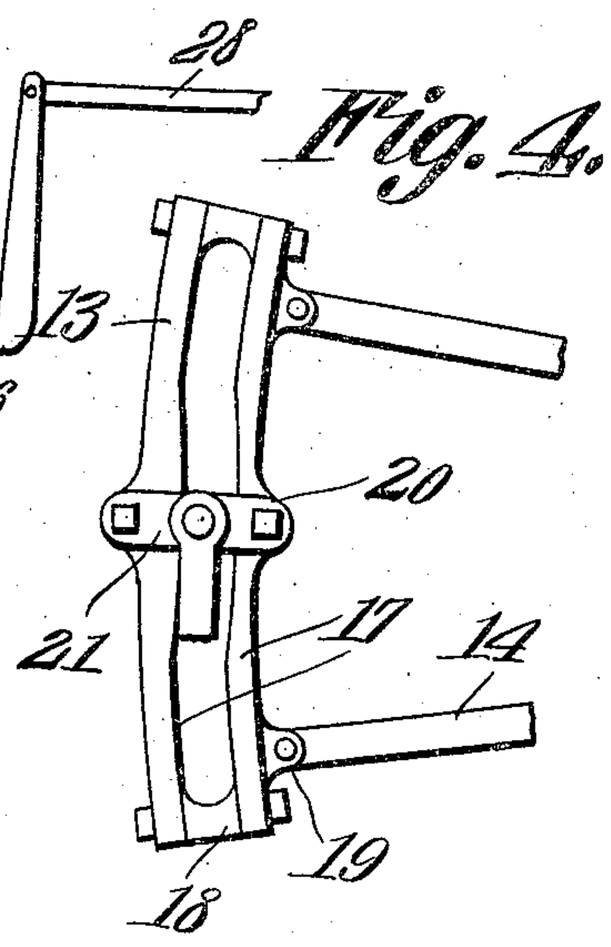

Fig. 4.

Fig. 3.

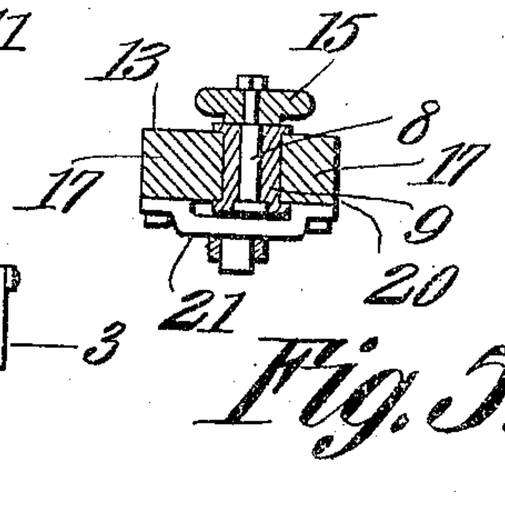

Fig. 5.

Fig. 2.

Witnesses

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UNITED STATES PATENT OFFICE.

GEORGE W. BAKER, OF RHEEMS, PENNSYLVANIA.

ENGINE.

999,143. Specification of Letters Patent. Patented July 25, 1911.

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To all whom it may concern:

Be it known that I, GEORGE W. BAKER, a citizen of the United States, residing at Rheems, in the county of Lancaster and State of Pennsylvania, have invented a new and useful Engine, of which the following is a specification.

This invention has relation to engines and consists in the novel construction and arrangement of its parts as hereinafter shown and described.

In general the present invention provides in combination with a steam engine of that pattern generally known as the "Corliss type"; valves and valve operating mechanism which may be manipulated when the engine is running at a high rate of speed, to trap in the engine cylinder, as the piston covers the exhaust port upon its return movement toward the induction port, an amount of the steam under pressure, which trapped steam is part of that which has previously been used while expanding to force the piston toward the exhaust port. The steam thus trapped is compressed within the cylinder between the piston and the cylinder head as the piston moves toward the induction port, but by reason of the fact that the engine is running at a fast or high rate of speed, this compression is accomplished by the momentum of the engine and the load that it carries, and does not materially or even perceptibly retard the action or speed of the engine.

The special object of the invention is to provide manually operable means located in the exhaust casing of the engine for varying the pressure at which the steam is trapped in the cylinder, and by so locating the means leaving the outer portions of the engine cylinder devoid of projecting parts whereby the engine will not be objectionable for use upon locomotives.

In said drawings:—Figure 1 is a side elevation of a portion of the engine. Fig. 2 is a horizontal sectional view through the cylinder of the engine. Fig. 3 is a transverse sectional view on the line 3—3 of Fig. 2. Fig. 4 is a side elevation of a link forming part of the valve gear of the engine. Fig. 5 is a sectional view of said link.

In the drawings, 1 denotes the cylinder, in the bore 2 of which a piston 3 reciprocates. The cylinder is closed at its ends by heads 4 provided with suitable stuffing boxes. Through the stuffing box of one cylinder head passes a stem 5 extending from one side of the piston, said stem serving merely as a guide. From the other side of the piston extends a piston rod 6 which passes through the stuffing box on the other cylinder head and is connected to a cross head of any suitable pattern, (not shown).

The steam inlet ports of the cylinder are indicated at 10 said ports opening into the bore of the cylinder at the respective ends thereof. Valves 11 of any approved type control these ports, said valves being operated from eccentrics (not shown) which in turn are operatively connected with a shifting link 13 by means of rods 14. A rocker arm 15 is fulcrumed upon the engine frame at 15′ and a pin 8 is fixed to the lower end of the said rocker arm and a roller 9 is journaled upon the said pin. The said roller is located in the slot of the links 13 above referred to. The upper end of the rocker arm 15 is connected to the valve actuating rod 16.

The link 13 is of skeleton form and comprises front and back spaced members 17, said members being held in spaced relation by means of spacing blocks 18 which are inserted between the ends of the said members and secured by bolts. These members 17 have curved inner edges, and inasmuch as the said edges are spaced the space between the members having the curved faces constitutes the slot of the link. It is in this slot that the roller hereinbefore mentioned lies. The innermost member 17 is provided with ears 19 to which the forward ends of the eccentric rods 14 are pivotally connected. The members 17 are also provided at their sides and at points intermediate their ends with lugs 20 to which is secured the ends of a cross strap 21. The said strap 21 bridges the slot formed in the member 13.

Means for shifting the link 13 is provided and as illustrated in the drawing, the said means consists of a bell crank lever 26 partially shown and which is fulcrumed on the engine bed and operated in any appropriate manner. Said lever 26 is connected with the cross strap 21 by means of a link 27. The other arm of the bell crank lever 26 is connected by means of a rod 28 to a lever, not shown.

Leading from the bore of the cylinder 1 is a circular series of exhaust ports 32 which opens into exhaust cavities 33 formed in the cylinder walls at the top and bottom thereof to afford ample exhaust passage. The exhaust

cavities open at one end through one side of the cylinder wall and over said ends is mounted a casing 34 into which the exhaust is discharged, said casing having an outlet 35. The exhaust cavities 33 are formed with cylindrical portions 36 in which operate rotary valves 37 controlling the escape of the exhaust, these valves being provided with bypasses 37′ to permit the exhaust to discharge into the casing 34. Each valve 37 terminates at one of its ends in a circular valve seat 38 which is engaged by a valve 39 held by a coil spring 40 engaging the back of the valve. These valves open into the casing 34 to permit the exhaust steam to pass thereinto from the valves 37. Upon the outer side of the cylinder wall 1 are mounted cylinders 41 which inclose the springs 40 and the valves 39 and which serve as guides for the said valves 39. Pistons 42 are slidably mounted in the outer portions of the cylinders 41 and the outer ends of the springs 40 bear against the inner ends of the said piston. A shaft 42′ is journaled for rotation in the casing 34 and extends transversely across the ends of the cylinders 40. Said shaft 42′ is provided with eccentrics 43 which bear against the outer or forward structures of the pistons 41. The shaft 42 is provided at its lower end with a crank arm 44 which is connected by means of a rod 45 with an appropriate lever mechanism not shown. Therefore it will be seen that by moving the rod 45 longitudinally and turning the shaft 42′ through the crank arm 44 the eccentrics 43 will be swung about the axis of the shaft 42′ whereby the pistons 41 may be forced in along the cylinders 40 or the springs contained within the said cylinders may move the said pistons in an outward or forward direction. Therefore it will be seen that a manually adjustable means is provided for increasing or diminishing the tension of the springs 40 and it will be readily understood that when the tension of the said springs is increased or the said springs are compressed to a high degree the valves 39 will be more firmly held in position against their seats and it will require a heavier or higher steam pressure to remove the said valves from their seats. For instance if the springs are set to resist a pressure of forty pounds, the steam at a greater pressure may escape from the cylinder when the piston uncovers the exhaust ports, but the steam at or below this pressure will be trapped in the cylinder and compressed upon the return stroke of the piston.

What is claimed is:—

In combination with an engine including a cylinder having a piston mounted for reciprocation therein, said cylinder having an induction port at one end thereof and an exhaust port centrally thereof with an exhaust casing at its inner side into which the exhaust port discharges; a manually operable valve controlling the exhaust port and having a by-pass which communicates with the interior of the exhaust casing, a spring pressed valve mounted upon the exhaust valve and normally closing the by-pass thereof, the tension of the said spring being opposed to pressure from the cylinder, and means located in the exhaust casing but operable from the exterior thereof for varying the tension of said spring.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

GEORGE W. BAKER.

Witnesses:

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