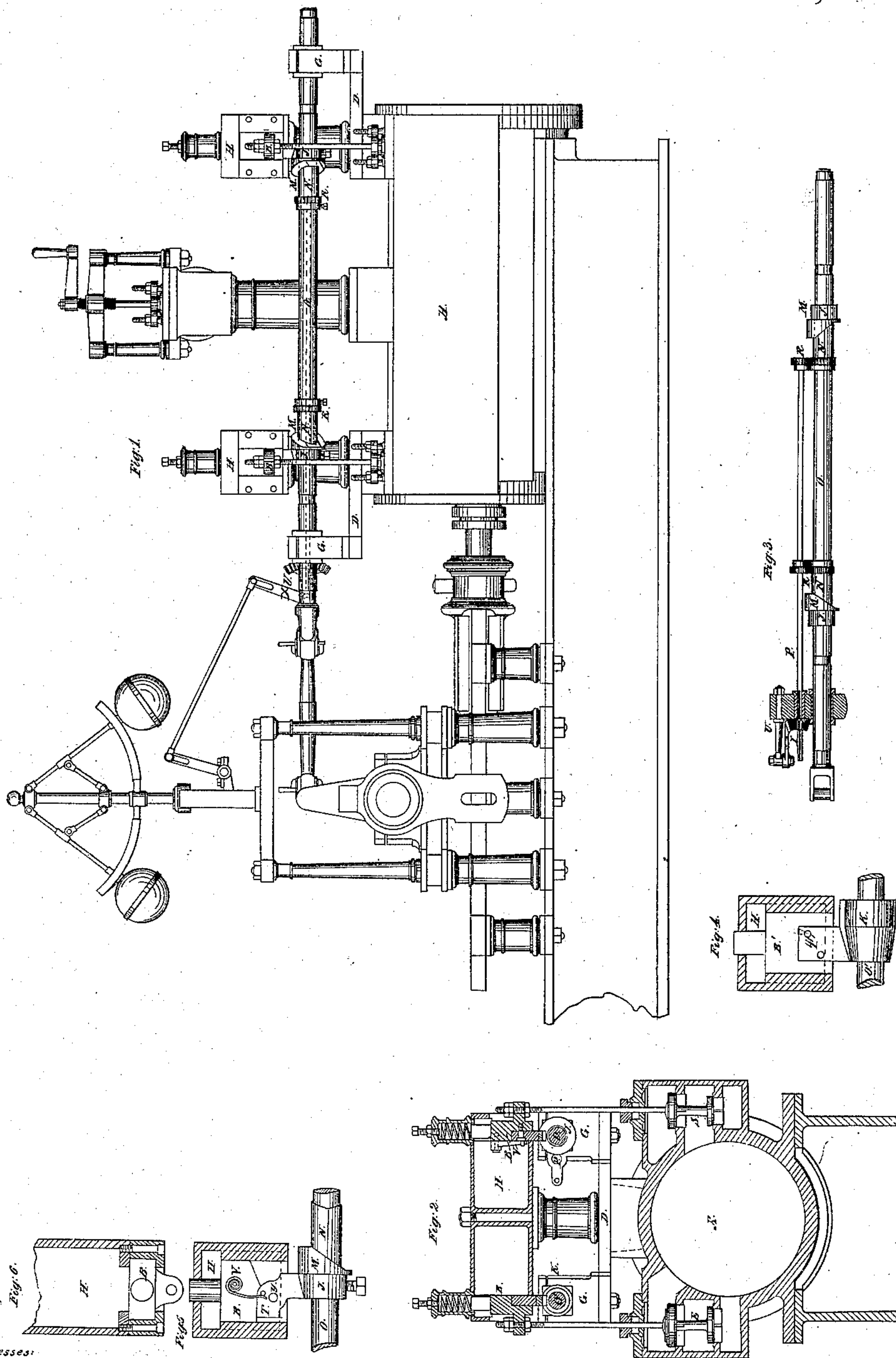


Gatly & Howe,

Steam-Engine Valve-Gear.

N^o 23,165.

Patented Mar. 8, 1859.



Witnesses:

*J. F. Seabury,
Atty. Genl.
Geo. W. Cotton.*

Inventor:

*Donat Gatly
Amos Howe*

UNITED STATES PATENT OFFICE.

SAML. GATY AND AMOS HOWE, OF ST. LOUIS, MISSOURI.

METHOD OF OPERATING PUPPET-VALVES OF STEAM-ENGINES.

Specification of Letters Patent No. 23,165, dated March 8, 1859.

To all whom it may concern:

Be it known that we, SAMUEL GATY and Amos Howe, of St. Louis, in the State of Missouri, have invented a new and Improved Method of Operating Puppet-Valves of Steam-Engines; and we do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, which form a part of this specification.

Figure 1 is a side elevation and Fig. 2 a transverse section of a steam engine with our improvement attached. A, is the steam cylinder, S, the steam valve, and E, the exhaust valve, as commonly constructed. The valves are connected by their stems and adjusting nuts to the puppet heads, B, B', which work and are guided vertically in guides formed in the ends of the two cross pieces, H, H, fastened on the ends of cylinder A. There is also attached to the ends of cylinder A, plates, D, D, with the guide bearings, G, fitted to guide the horizontal valve rods, O, O. These rods derive their motion from eccentrics on the main shaft of the engine, and may be connected directly, or by means of the customary rock shafts and links. J, J, are the steam valve lifters, and K, K, the exhaust valve lifters, fastened and adjusted on the valve rods, O, O, by temper screws. These lifters have a wedge shaped face formed upon them of an angle equal to the lift of the valves. M, M, are cut off rings attached to the sleeves, N, N, and are connected to each other by the small shaft P, and spur gear R. These sleeves and cut off rings revolve on the valve rod O. On the end of shaft P is the small bevel pinion I, gearing into the bevel segment, U, from which the motion regulating the expansion is obtained. The cut off rings, M, M, are made of a graduated length, from a short to a long side by means of which the expansion is measured.

Fig. 3, is a plan of the valve rod O, and expansion gear detached.

Figs. 4, 5 and 6, show the construction of the steam and exhaust lifters and puppet heads.

Fig. 4, is a section of the cross piece H, showing the exhaust puppet head B' with the lifting piece T', attached. This lifting piece has a beveled face formed upon its lower side of the same angle as the face of the exhaust lifter K.

Figs. 5 and 6 are sectional views of the cross piece H, showing the steam puppet head B and guides. T, is a jointed lifting piece working on a center Y and is kept in position by the spring V.

Having now described the construction of our invention, we will describe its operation. Motion being communicated to the valve rods O, O, by the eccentrics the steam lifter J, is brought in contact with the jointed lifting piece T, of the steam puppet head B, and raises it with its attached valve to a height equal to the angle of its lifting face, the valve is then held in this position by the cut off ring M, for a length of time corresponding to the length of its side then in contact with the jointed lifting piece T. The valve and puppet head then fall and the steam is cut off, the valve rod O, passes on until it obtains its full motion and returning brings the cut off ring in contact with the jointed lifting piece which raises on its center Y, and allows the ring and lifter to return to its original position while the jointed lifting piece T, is also replaced by the spring V. The steam valve at the other end of the cylinder A, is operated in the same manner. Both steam valves are held up for the same length of time and steam is admitted into each end of cylinder A, in equal quantities, the cut off rings M, M, being so adjusted that the difference in their lengths will obviate the effect on the steam valve motion caused by the difference of parallelism of the connecting rod and piston rod. The expansion is varied by means of the lever X, or bevel segment U, or the engine made self regulating by attaching the governor to lever X, as shown in Fig. 1. Any required delicacy of action may be obtained by varying the angle of cut off rings M, M, or by different combinations of the connecting gearing R. The motion of the valve rod O' also brings the exhaust lifter K, in contact with the lifting piece and puppet head B', raising it and the valve to the height of the angle of the lifter, and holding it in that position until the return motion of the valve rod O' releases it, thereby holding the exhaust valve up during the entire stroke of the piston.

What we claim as our invention and desire to secure by Letters Patent is—

1. The steam lifters J, J, exhaust lifters K, K, and puppet heads B, B', with their respective faces as herein described for the

purpose of operating steam and exhaust valves, of puppet valve steam engines.

2. The lifter J, in combination with the jointed lifting piece T, puppet head B,
5 and graduated cut off ring or sector M, for the purpose of producing a variable expansion motion, self regulating or otherwise, substantially as herein described.

3. The relative adjustment of the cut off

rings M, M, for the purpose of admitting 10 steam in equal quantities in each end of the steam cylinder in the manner herein described.

SAML. GATY.
AMOS HOWE.

Witnesses:

GEO. W. COTTON,
EDW. W. SHANDS.