J. A. STEPHENS.
Balanced Steam-Valve.

No. 208,344. Patented Sept. 24, 1878.

Fig. 1.

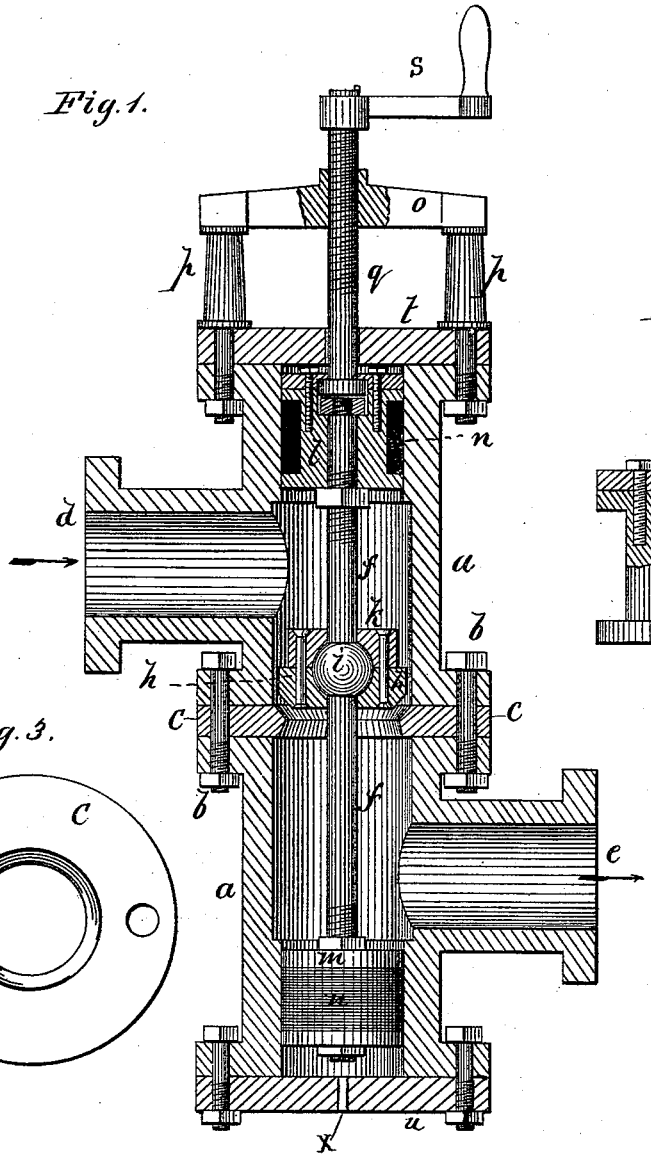

Fig. 2.

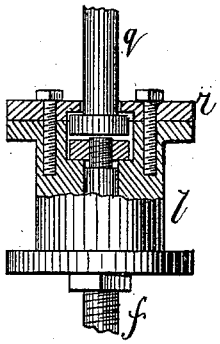

Fig. 3.

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JOHN A. STEPHENS, OF LECOMTE, LOUISIANA.

IMPROVEMENT IN BALANCED STEAM-VALVES.

Specification forming part of Letters Patent No. **208,344**, dated September 24, 1878; application filed July 27, 1878.

To all whom it may concern:

Be it known that I, JOHN A. STEPHENS, of Lecomte, in the parish of Rapides and State of Louisiana, have invented a new and Improved Balanced Steam-Valve, of which the following is a specification:

My invention relates to valves for steam-engines which are balanced by the pressure of the steam, and is particularly intended for the throttle-valves, to render the working of them easier, so that they require to operate them only power sufficient to overcome the friction of the parts.

The said invention is also adapted to exhaust and governor valves.

My invention consists in a valve-stem supported in a valve-chamber by a piston-head at each end of the stem, and carrying a valve midway of its length, which stem and valve are operated to open and close the valve by a screw-rod or other means.

In the drawing, Figure 1 is a vertical section of a valve and valve-chamber embodying my invention. Fig. 2 is a sectional elevation of one piston-head, and Fig. 3 is a plan of the valve-seat.

Similar letters of reference indicate corresponding parts.

a is the valve-case, formed of two hollow cylinders united at their flanged ends by bolts *b*, which bolts *b* also secure the intermediate ring *c*, forming the valve-seat. The steam comes from the boiler by the pipe *d*, and passes to the engine by pipe *e*.

f is the valve-stem, extending through the valve-case *a* from end to end, and carrying about midway of its length the valve *h*, which, when closed, rests upon the valve-seat *c*. The valve *h* consists of a metal disk around the stem *f*, and having a socket to fit upon a ball, *i*, on the stem *f*; and *k* is a ring with a similar socket, secured by screw-bolts to *h*, so that the valve *h* is held by the ball *i*, but may turn thereon.

The outer ends of the valve-chamber above the pipe *d* and below the pipe *e* are turned smooth, and the valve-stem *f* is provided at its ends with piston-heads *l* and *m*, which fit into the said ends of the valve-chamber, so that the stem *f* is the piston of the heads *l* and *m*. The heads *l* and *m* are packed, as at *n*, and move with the valve-stem *f* when it is operated to open and close the valve.

o is a brace or arch, supported by pillars *p* at the end of valve-case *a*, and carrying a screw-rod, *q*, for opening and closing the valve *h*. The screw-rod *q* is connected adjacent to the end of the valve-stem *f* by a ring-plate, *r*, (see Fig. 2,) around the rod *q*, bolted to the piston-head *l*, and an offset on the end of the rod *q*, which takes under the edge of the ring *r*. This connection permits the rod *q* to turn independently of the stem *f*, but moves the stem endwise.

The screw-rod *q* is to be operated by a wheel or handle, *s*, in any usual manner, and it is evident that the rod *q* might be the valve-stem of a governor.

If the valve *h* be open, as shown in the drawing, the steam comes in at *d* and passes out at *e*. Thereby the pressure is equal upon the heads *l* and *m* in opposite directions, and the valve and stem are balanced. When the valve *h* is closed upon its seat, the pressure will be in opposite directions upon the head *l* and valve *h*. In either position of the valve the moving parts are balanced, and, whatever may be the weight of the same, the power required to operate the valve needs only to be sufficient to overcome friction.

The ends of the valve-case *a* may have caps *t u* bolted upon them, as seen in the drawing.

I do not limit myself to the details of construction set forth—that is, for instance, the connection of the valve and stem, the manner of operating the valve-stem, or the construction of the piston-heads. These may be varied without departing from my invention.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

The combination of the valve-stem *f*, having an upper piston-head, *l*, a central valve, *h*, and a lower piston-head, *m*, with the valve-casing *a*, having an inlet-pipe, *d*, above the valve-seat *c*, and an exit-pipe, *e*, below the said valve-seat, substantially as and for the purpose described.

JOHN ALEXANDER STEPHENS.

Witnesses:

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B. MAYER.