W. Wright,

Check Valve,

No. 15,208, Patented June 24, 1856.

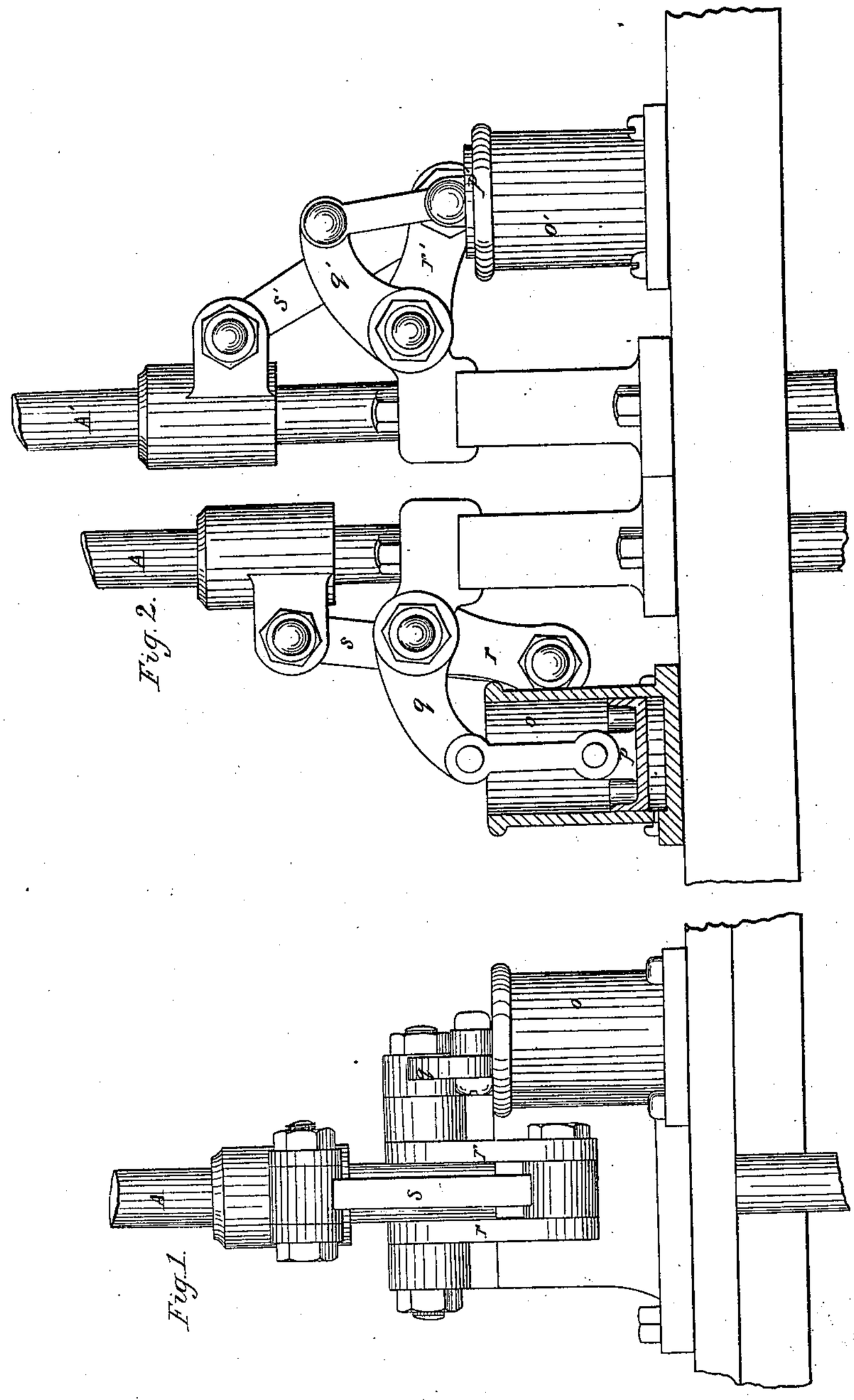

Fig. 2.

Fig. 1.

UNITED STATES PATENT OFFICE.

WILLIAM WRIGHT, OF HARTFORD, CONNECTICUT.

CUT-OFF-VALVE CHECK FOR STEAM-ENGINES.

Specification of Letters Patent No. 15,208, dated June 24, 1856.

To all whom it may concern:

Be it known that I, WILLIAM WRIGHT, of Hartford, county of Hartford, and State of Connecticut, have invented certain new and useful Improvements in Valve-Checks for the Cut-Off of a Steam-Engine; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being made to the annexed drawing, making a part of this specification, in which—

Figure I is an end view or elevation; Fig. II is a side view or elevation partly in section; and similar letters indicate similar parts throughout.

My invention consists in so connecting or attaching the valve-stem to the mechanism employed to prevent the slamming of the valve, that while the said valve is retarded in its fall in order that it shall drop quietly into its seat it will yet be permitted to continue its rapid motion during the greater portion of that fall, whereby the act of cutting off the steam, at the desired point of the stroke, is more fully and effectively performed. The "dash-pot," in its various forms, is the mechanism usually preferred, and I will therefore describe my invention as connected with that contrivance. There has been hitherto in the operation of that a particular fault and which my improvement is designed to remove, viz: that although the momentum of the cut-off valve is by it checked or arrested, so that at the termination of its descent it rests upon its seat without concussion, as desired, the said checking has been nevertheless a gradual act, diffused, as it were, equally throughout the fall, whereas it is evident that the more suddenly the cut-off can be accomplished the better will be its effect, and this is especially the condition requisite for engines using the expansive principle for the greater part of the stroke. In these, if the valve does not close almost instantly, the steam will be, as it is called, "wire-drawn," resulting in such cases in a loss of effect, or an increased consumption of steam to no purpose. In the former method of fitting the "dash-pot" connections the pistons in those fell with the same velocity as the valve, and hence where in order to secure the required cutting off there was much speed required in the descent of the latter, then the blow given on the seat would still be considerable, and hence there has been a limit to the speed of the fall far within the requirements of the case. By this improvement, however, the greatest speed ever required to be given in any degree of cut-off can be obtained, and still the concussion or blow upon the seat will be obviated. This is accomplished by causing the valve to descend with a varying speed, being very rapid for nearly the whole of the distance and greatly retarded just before reaching its seat. The air or other fluid in the dash-pot being driven out through a hole of fixed size will retard the descent of the valve to a certain time depending upon the proportionate size of the hole to the quantity of fluid to be expelled, as well as to the weight of the valve and connections, and, as before explained, the resistance or force in the old method being constant, the speed is also equal throughout.

My improvement lies then in so applying the retarding force which upholds the valve that it is made to act upon the latter indirectly, viz: through the intervention of levers, the action of which shall be similar in effect to the sliding of the "pea" along a scale beam, being powerful according to the distance from the fulcrum.

Figures I and II are detached views of the dash pots and connecting mechanism, Fig. I being an end view and Fig. II a side view, one of the dash-pots in section being represented at (o) and the other at (o').

At A and A′ are the lift-rods connected with the induction valves of the engine. The pistons (p) are attached to one end of a cranked lever (q), the other arm (r) of which is set off to one side by a cross shaft, as shown in Fig. I. From the end (r) a link (s) extends to the lift-rod or valve stem A. On the lift-rod A′ the same pieces are represented by the letters (s' q' r'), thus indicated because the rods and consequently these parts are in two different positions. The lift-rod A is in the position it has when its valve is in the seat, and the rod A′ is as when its valve is raised to the full height. It will be seen that when the valve has been thus raised the arm (r') of the cranked lever is in a position nearly horizontal. When therefore the toe becomes disengaged and the weight of the valves and attached parts is thrown upon the piston in the dash-pot, that accordingly descends with a velocity due to such weight. As the crank (r') turns with its shaft, the link (s') approaches the center, and the

force upon the piston (p) becoming thereby diminished the descent of the valve is retarded accordingly in consequence of the reduced velocity with which the air is driven out of the dash-pot, for when the valve has finally found its seat as in A the link as shown at (s) will be nearly on a central line with its crank (r). Thus the rate of the descent of the valve is affected by two causes; first the approach of the crank (r) toward its center, and second the gradually diminished power applied in driving out the fluid from the dash-pot. Hence it follows that the speed of the valve in its descent may be allowed to be very great for the major part of the distance, inasmuch as the crank (r) may be permitted to approach its center sufficiently near to reduce the speed to the proper limit for preventing a violent blow or concussion at the moment of striking its seat.

It is obvious that the same principle may be applied to other contrivances for arresting the fall of the valve, in which the like defect exists.

What I claim is—

The arrangement for retarding the descent of the valve, namely the combination of the bell-crank (q, r,) with the valve on the one part, and the dash-pot, or equivalent resisting apparatus on the other, so coupled and operating that the arm of the crank to which the valve is attached shall be approaching its center when descending, while the other arm connected with the piston in the dash-pot shall be approaching its greatest throw, thereby checking the rate of descent of the valve by a force compounded of the diminished speed and diminished pressure as described.

WM. WRIGHT.

Witnesses:
J. P. PIRSSON,
S. H. MAYNARD.