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J. B. ALLFREE.

REVERSING MECHANISM.

(Application filed Oct. 11, 1900.)

(No Model.)

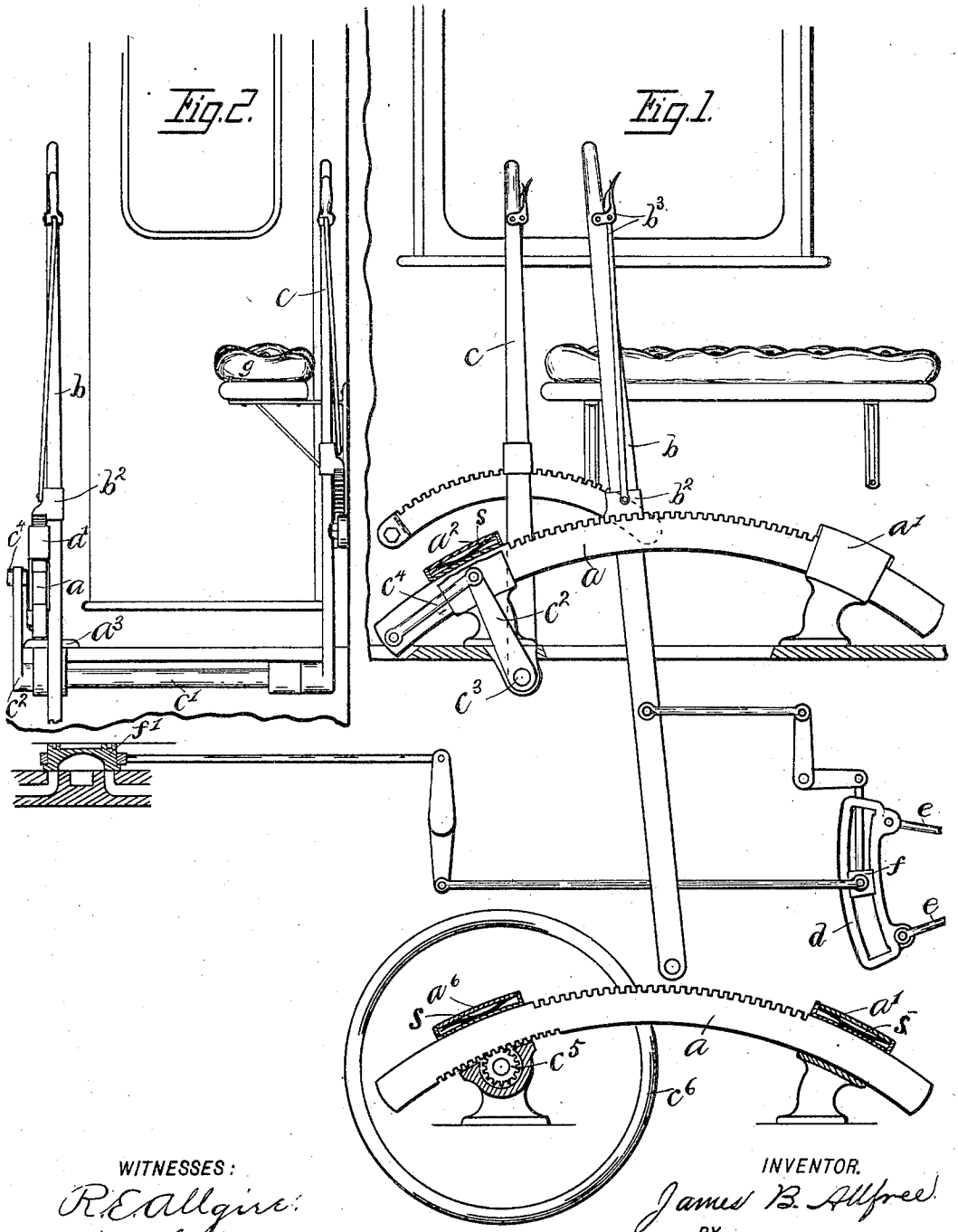


Fig. 3.

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REVERSING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 696,921, dated April 8, 1902.

Application filed October 11, 1900. Serial No. 32,796. (No model.)

To all whom it may concern:

Be it known that I, JAMES B. ALLFREE, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Compound Cut-Off and Reversing Mechanism, of which the following is a specification.

My invention relates to an application in steam-engineering, and has for its objects the economical use of steam as brought about by the proper adjustment of the movement of a slide-valve that the best point of cut-off may be attained suitable to all loads at various times, and, second, that this may be most conveniently done by the attendant, being especially designed and adapted for use on railway-locomotives as manipulated in the present day.

It is well understood among locomotive engineers that if it is possible to set the reverse-lever at the proper point the highest economy will result; but as a result of the difficulty in moving the reverse-lever as ordinarily constructed the throttle is resorted to for the control of the engine, whereas if it were possible to obtain a correct or refined adjustment of the valve's movement by the reverse-lever the throttle-valve could be left full open. By the use of my device I obtain a micrometer or highly-refined adjustment, which may be operated with one hand without necessitating the engineer to move out of his regular and ordinary position. This adjustment may be readily accomplished without diminishing the steam-pressure by throttling the engine and wholly regardless of a hard-moving valve. While a great deal of difficulty always attends the adjustment of the ordinary reverse-lever, much more difficulty arises by an imperfectly-balanced or an imperfectly-lubricated valve, it ofttimes requiring the full strength of the engineer, which makes it quite impossible to obtain a close or accurate adjustment. In my device the reverse-lever is in no way changed or disturbed, and after the general adjustment is obtained the close adjustment may be accomplished with one hand without material effort. I attain these objects as applied to a railway-locomotive as at present controlled by lengthening the customary sector employed in connection with the so-called reversing-lever and link-motion and attendant parts, providing sliding supports for said sector that it may have a longitudinal movement at certain times, which may be adduced by various mechanical means and by the special arrangement of which the ordinary adjustments of the valve-motion are not in any way interferred with at start or stopping of the engine, but while and during running time of the engine minor adjustments may be made by the engineer with my device instead of resorting to throttling for the regulation of steam required to maintain the proper rate of speed, so that very material economy in steam consumption is attained over the present practice of throttling to suit the constant attendant variations being met with on the average railroads.

The construction of my device is shown in the accompanying drawings, in the different views of which the same letters of reference point out the same parts.

Figure 1 is a broken side elevation of my device, showing portions of the cab and seat. Fig. 2 is a broken end elevation of my device. Fig. 3 is a broken side view of another suitable form of apparatus.

a represents the movably-mounted toothed sector combined with the customary adjusting-lever b, terminating at top in a handhold and provided with a locking pawl or block b^2, provided with teeth suited to engage with the teeth of said sector and provided with an operating link and lever b^3.

a' and a^2 are housings in which is movably mounted the sector a, said housings in this case being provided with bases to secure to the floor, one of said housings a^2 in this case being provided with a depending projection a^3, in which is mounted one end of a short transverse shaft c', and to this end of said shaft is secured a lever c^2 at c^3, which is adapted to be oscillated by said shaft, and to opposite end of said lever is secured one end of a link c^4, the opposite end whereof is pinned to the said sector, whereby motion is communicated to said sector. At opposite end of said shaft c' is mounted thereon operating-lever c, extending upwardly to a convenient position in reach of the engineer when in the seat g.

At b^4 is secured one end of a connecting link or rod, which is secured at its opposite end to the link of the link-motion mechanism.

d is the link.

e e are the rods connecting the link to the eccentrics.

f represents the sliding block in the link, to which by intervening mechanism is connected the valve f'.

s s are interposed springs adapted to prevent or take up all shake or lost motion of the sector a in its housings.

The other mechanism I show in the drawings substitutes the rack and pinion, in this case teeth a^4 being cut at under side of the sector a and a pinion c^5 mounted in suitable housings on one end of cross-shaft c'. On opposite end of said shaft a suitable hand-wheel c^6 is secured, the upper section of the rim of said wheel coming in easy reach of the engineer when in the seat, so that in the use of either construction the application is so conveniently accomplished that the throttle will not be resorted to by the operator, so that the best results will be attained, as the use of my device is more convenient than was the customary use of the throttle formerly for the stated purpose of regulation.

The customary position for the engineer is in the seat that the roadway may be viewed through the pilot-window, and my device is so arranged that the manipulating-lever or hand-wheel is placed at a point in easy reach of the right hand of the operator and that the direction of movement for the increase or decrease of cut-off is attained by movements corresponding to that of the reverse-levers, so that under excitement or custom from force of habit of a forward motion for increase and that of a backward motion to decrease the steam-supply remain the same, so that there will be no confusion in its application, to the general engineers of the day, and it will be apparent that the saving in fuel will be very material where it is possible to adjust at all times the length of cut-off to suit the load or grade instead of throttling the steam to regulate the speed, as in the latter case the expansive force of steam is not fully utilized.

There are a number of changes in the construction of my device that may be resorted to to produce the result here claimed without departing from the spirit and scope of my invention, and I reserve the right to resort to any such changes as fall fairly within the range thereof, and

What I claim as new, and desire to secure by Letters Patent, is—

1. In a compound cut-off and reversing mechanism for valves of steam-engines, a reversing-lever and adjustably-mounted sector, wherewith said lever is adapted to engage, and means for moving said sector in a longitudinal direction.

2. In a compound cut-off and reversing mechanism, a reversing-lever in combination with a longitudinally-adjustable toothed sector, said sector being carried in guides or their equivalent, an auxiliary lever or other equivalent means, for the purpose of adjustment of said sector, about the axis of its arc, and means whereby the toothed sector may be engaged temporarily with or attached to the reversing-lever.

3. In a compound cut-off and reversing mechanism, the combination with the ordinary reversing-lever, a longitudinally-adjustable sector, a rack and pinion or other suitable means for accomplishing the said longitudinal adjustment, means for temporary engagement of said sector with said reversing-lever by means of which said lever is moved upon its axis in unison with adjustments of said sector, as shown.

4. In a compound cut-off and reversing mechanism, a sector adjustably mounted in guideways or suitable bearings, and means by which said sector may be temporarily attached to a reversing-lever, an auxiliary adjusting-lever mounted in fixed bearings and a link or suitable connections between said movable sector and said auxiliary adjusting-lever, whereby the said sector may be moved, carrying with it at will said reversing-lever, for the purposes specified.

In testimony whereof I have hereunto subscribed my name this 6th day of October, A. D. 1900.

JAMES B. ALLFREE.

Witnesses:
WM. C. HALL,
A. L. TEETOR.