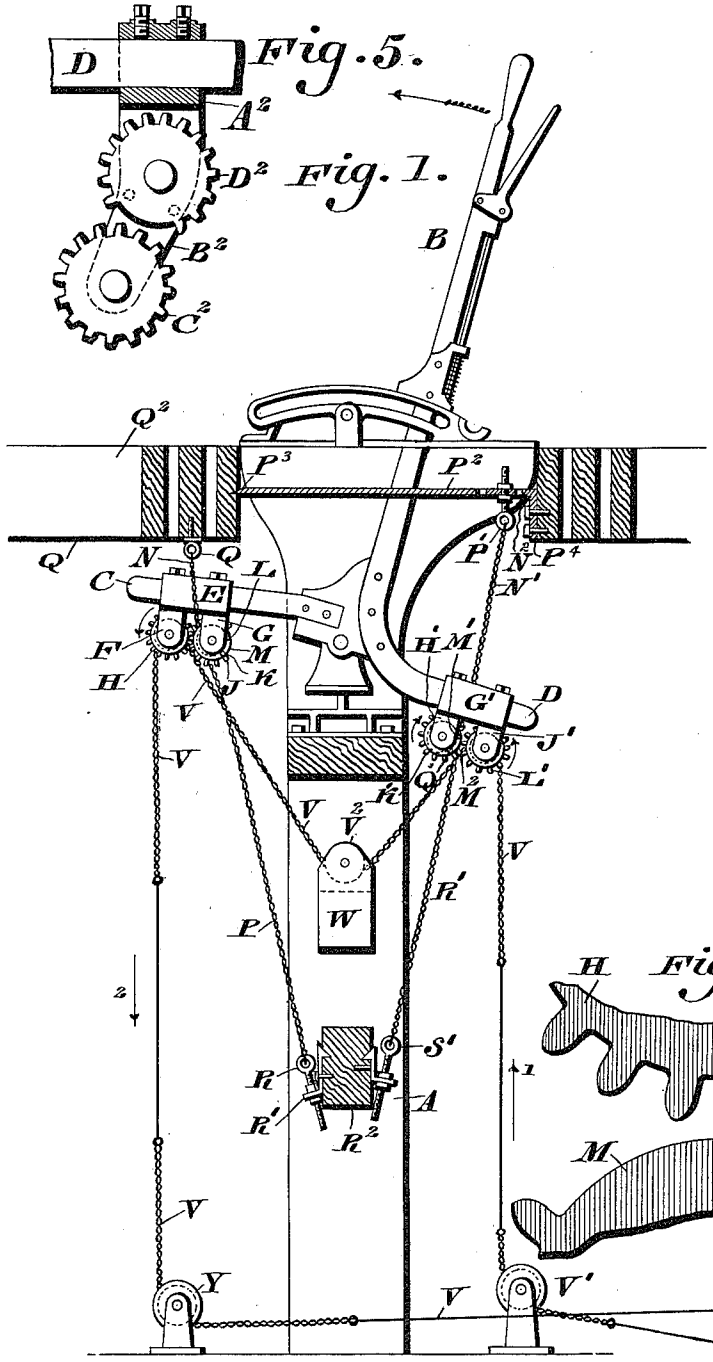
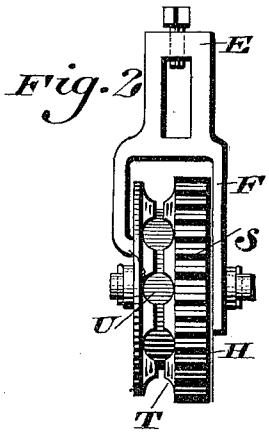
(No Model.)

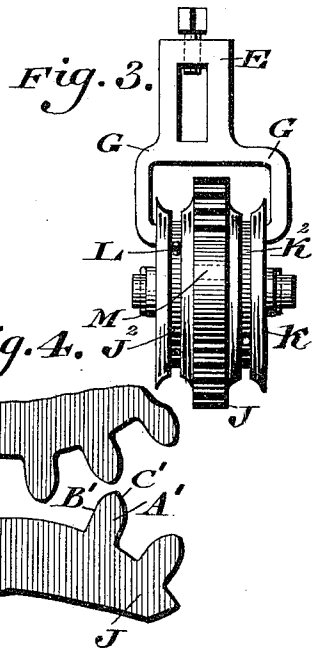
J. R. JONES.

WIRE COMPENSATOR FOR RAILROAD SIGNALS AND SWITCHES.

No. 566,321. Patented Aug. 25, 1896.







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WIRE-COMPENSATOR FOR RAILROAD SIGNALS AND SWITCHES.

SPECIFICATION forming part of Letters Patent No. 566,321, dated August 25, 1896.

Application filed January 30, 1896. Serial No. 577,437. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH R. JONES, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Wire-Compensators for Railroad Signals and Switches, which improvement is fully set forth in the following specification and accompanying drawings.

My invention relates to wire-compensators for railroad signals and switches; and it consists of a novel construction of a compensating device in which the number of parts is reduced to a minimum and the operation rendered more positive and effective than heretofore.

It further consists of novel details of construction, all as will be hereinafter set forth, and specifically pointed out in the claims.

Figure 1 represents a side elevation of a wire-compensator for railroad signals, switches, &c., embodying my invention. Fig. 2 represents, on an enlarged scale, a front elevation of a yoke and gears employed, showing also a sprocket-hub on said gear. Fig. 3 represents a side elevation of a gear employed, having a portion of its periphery recessed to the base-line of its teeth blank and provided with grooved hubs. Fig. 4 represents, on an enlarged scale, a side elevation of intermeshing gears employed, to be hereinafter referred to. Fig. 5 represents a view of a modification of a portion.

Similar letters of reference indicate corresponding parts in the several figures.

Referring to the drawings, A designates a suitable standard, to the upper portion of which is fulcrumed the operating-lever B, the lower portion of the latter being provided with the laterally-extending arms C and D. In the present instance the compensating device is shown as placed below the floor, the fulcrum of the operating-lever being mounted upon any suitable support and the connections hereinafter referred to being made to the ceiling and to novel points, as will be hereinafter explained. The said arm C has adjustably mounted thereon the yoke E, which is held in position in any suitable manner, and has the ears F and G depending therefrom, said ears F having journaled therein the gear-wheel H, which is adapted to mesh, as will be explained, with the gear-wheel J, which latter has attached thereto at the point K one end of the connection P, the other end of the latter being attached to the eyebolt R, which is adjustable in the bracket or angular support R′, which is attached to the timber R^2, said eyebolt being readily held in desired position by means of the jam-nuts or similar devices.

N designates another connection, which has one end attached to said gear J at the point L, the other end thereof being attached to the lag-screw or eyebolt Q, which is screwed into engagement with the ceiling of the floor Q^2, said connection N, it will be noted, when the parts are in the position seen in Fig. 1, passing around the lower portion of the gear-wheel J, while the connection P passes around the upper portion of said wheel, it being also noted that said gear-wheel J has a portion of its periphery untoothed or blank at the point M, on or about the base-line of its teeth.

The detail construction of the gear-wheels H and J will be apparent from Figs. 2 and 3, said gear H having arranged at one side thereof the hub T, which is provided with the recessed face U, forming a sprocket-hub which is adapted to be engaged by a chain V or similar connection, which latter has one extremity, after passing over said gear H, passing under the pulley V^2, which carries the weight W, and thence over a second sprocket-hub on the wheel L′, which is similar to the wheel H, and thence under the chain-pulley V′. The other end of said chain V, after passing over said pulley H, passes under a chain-pulley Y. The extremities of both connections V are seen at the right of Fig. 1, it being understood that the same are suitably connected to the operating mechanism of a signal-arm, switch, or other similar device, as is evident.

The detailed construction of the wheel J will, as above stated, be understood from Fig. 3, said wheel having on each side thereof the grooved hubs J^2 K^2, which have connected therewith the chains or connections N P at

the points L and K, as has been already explained. The arm D has adjustably mounted thereon the yoke G′, which has the ears H′ J′ depending therefrom, in which are journaled the toothed gears K′ L′, respectively, which correspond to the similarly-arranged toothed gears J H, whose construction in detail will be understood from Figs. 2 and 3, as already referred to.

The gear K′ has attached to it at the point Q′ one end of a chain or other connection N′, while the other end of the latter is attached to an eyebolt P′, which passes through the member P^2 of the angle-bar N^2, which is supported in an opening through the floor Q^2, said member P^2 having a chisel-point P^3, which is adapted to enter the adjacent portion of one of the floor-timbers, the member P^4 of the angle-bar being bolted or otherwise secured to the opposite floor-timber, as will be understood from Fig. 1.

The member P^2 of the angle-bar is provided with holes at various points through which the eyebolt can be inserted, the latter being thus readily adjusted and held in position by means of jam-nuts.

M^2 designates a portion of said stop-gear K′, showing the recessed blank in which the teeth of the gear L′ can pass when they are out of mesh.

M′ designates the point of attachment of the chain R′, which passes over the top and under portion of the hub of the gear K′, the lower end of said connection R′ being attached to the eyebolt S′, which is adjustable in its support and held in position by means of jam-nuts, as is evident.

In the preferred embodiment of my invention I construct the engaging teeth A′ of the stop-gear wheels J and K′ which are closest to the blanks M or M^2, as indicated in Fig. 4, the said teeth A′ having the curvature on the face B′ of involute form, while the face C′ is of epicycloidal form, it being necessary to have the teeth of the intermeshing gear H all involuted or pointed, and it being further evident that in the case of the gear J the said teeth A′ must be one half turned one way and the other half turned the opposite way. By this peculiar arrangement and form of teeth it is almost an impossibility to lock the teeth when their points abut together, as there is less than a thirty-second of an inch in which they can strike, and even if it should happen that they sometimes hit the momentum given in their revolution will either throw the engaging tooth in mesh on the top of the adjacent tooth or the point of the engaging tooth will pass under said tooth and mesh on the next one, the importance of this feature being very great. By this peculiar form of engaging teeth the perfect working of a pair of gears which are in and out of mesh alternately is insured, one of said gears being free to rotate more or less, while the stop-gear is stationary when out of mesh. No other form of teeth can be made that will not abut together at their points when the latter present themselves opposite to each other.

In the position in which the gears are shown in Fig. 4 the engaging tooth would pass under the adjacent tooth and mesh on the next one. If the tooth on the wheel were just a trifle lower—less than a thirty-second of an inch—the engaging tooth would mesh on top of said tooth.

The operation is as follows: If the lever B is moved in the direction of the arrow, the arm D will be raised and the arm C will be lowered, whereupon it will be seen that an upward pull will be exerted upon the right-hand portion of the chain V in the direction of the arrow marked 1, while that portion of the chain V adjacent the arrow marked 2 on the left of Fig. 1 is simultaneously correspondingly released. The pull by the chain R′ on the stop-gear wheel K′ will cause the latter to revolve in the direction indicated by the arrow adjacent said gear, and the engaging tooth on said stop-gear K′ will then start to mesh in the teeth of the gear L′, causing the latter to rotate in the direction indicated by its arrow. It will thus be seen that the gears K′ and L′ will be in mesh, holding firmly that portion of the weighted chain V in proximity to said gears, while the lever B is held in said position and said chain is released only when the lever B is placed back to its normal position, at which point the stop-gear K′ presents its recessed blank to the teeth of the gear L′, which causes the latter to be out of mesh and free to rotate by the expansion or contraction of the connections to the switch or signal-arm, as the case may be, said connections being always governed or held taut by the weight W. It will thus be seen that when the lever B stands at normal the teeth of wheels H and J are in mesh and remain in mesh until the lever B is thrown to the opposite or left-hand side. When in this latter position, the stop-gear K presents its recessed blank M to the teeth of the gear-wheel H, whereby the latter is free to rotate by the expansion or contraction of the connections passing over the sprocket-hub on said wheel H.

The gear-wheels K′ and J are caused to rotate, respectively, by reason of the connections N′ R′ and N P, the same exerting a pull upon their respective gears, so as to cause their rotation in the proper direction according to whichever side the lever is moved.

It will be seen that when the lever B is moved from its normal position the chain N′ is released and winds around one of the hubs of the stop-gear K′, a pull being exerted on the chain R′, which unwinds said chain and causes a pull on the hub of said stop-gear and sets said stop-gear in motion, thereby causing the engaging tooth of said wheel to mesh in the teeth of the wheel L′.

It will of course be understood that other adjusting devices than that shown may be

employed instead of the eyebolts and lag-screws shown, whereby the tension of the connections N, P, N′, and R′ can be varied according to requirements, so as to adjust the relative positions of the blank portions M M^2 of the gears J and K′, as may be desired. It will further be evident that if the stroke or extent of movement of the chain V is too great this can be lessened by reversing the positions of the gears K′ and L′ relative to each other, and also the gears H and J.

It will be understood, further, that certain of the teeth on either side of the smooth portions M′ and M^2 may be made removable, so as to be taken out or replaced, if desired, thus varying the extent of movement of the chains or connections V, as is evident, it being also apparent that said connections V, &c., may be chains, ropes, cords, cables, or similar devices.

It will be apparent that my invention is applicable to signal-arms, switches, &c., and other similar devices in which it is desired to make provision for expansion or contraction caused by variation of temperature or other causes, it being immaterial how the yokes E and G′ are actuated or to what device the terminals of the chain V may lead, as is evident.

In Fig. 5 I show a modified manner of mounting the gears upon the arm of the operating-lever, in which D designates an arm, as before, upon which is mounted the yoke A^2, which latter has depending therefrom the ears B^2, in which are journaled the gears C^2 D^2, which are provided with sprocket and grooved hubs, respectively, as is evident, the manner of operation being the same as already hereinbefore described.

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

1. In a wire-compensator for railroad signals, switches, &c., a yoke having suitably journaled therein a gear-wheel having a sprocket-hub, a second gear-wheel adjacent thereto having a portion of its periphery recessed blank, and provided with hubs, connections from said latter gear-wheel to fixed points, and a weighted chain passing over said sprocket-hub and adapted to actuate a signal, switch, &c., substantially as described.

2. In a compensating device, an operating-lever suitably fulcrumed, arms extending laterally on either side of said lever, and a pair of intermeshing gears mounted upon each of said arms upon either side of the fulcrum of said lever, each pair of gears being adapted to mesh when the lever is raised, and to be out of mesh when the lever is at its lowest or normal point, and connections intermediate said gears and signal-arm, substantially as described.

3. In a compensating device, an operating-lever suitably fulcrumed, laterally-extending arms attached thereto, gears mounted upon said arms, and meshing upon the upstroke of the lever, and continuing in mesh until the lever is returned to normal points, certain of the gears of each having a stop-blank recess, and connections from the other gears for actuating a signal-arm, switch, &c., substantially as described.

4. In a compensating device for railroad signals and switches, an operating-lever suitably fulcrumed, arms attached thereto, and having toothed wheels journaled in suitable bearings mounted thereon, other toothed wheels adjacent the former ones having a blank space recessed in their periphery, and means for adjusting the extent of rotation of said latter wheel relative to the adjacent ones, in combination with connections adapted to lead to a signal-arm, switch, &c., substantially as described.

5. In a compensating device, a lever suitably fulcrumed and having a laterally-extending arm, a yoke on said arm, a stop-gear wheel having bearings on said yoke, a gear-wheel journaled adjacent said stop-gear, connections attached at one end to said stop-gear, and at their other ends to adjustable fixed points, and a weighted chain passing over the sprocket-hub of the wheel and adapted to be connected with a signal-arm or switch, substantially as described.

6. In a compensating device for railroad signals and switches, a pivoted lever with a laterally-projecting arm, gear-wheels journaled in bearings mounted on said arm, hubs on one of said wheels, and connections secured at one end to one of said hubs and passing under the same to an adjustable fixed point, and a connection secured to the other hub and passing over the same and connected with another adjustable fixed support, substantially as described.

7. In a compensating device for railroad signals and switches, an operating-lever suitably mounted, arms extending therefrom, one of said arms having mounted thereon a yoke E in which are journaled the gears H and J constructed as shown, the other of said arms having mounted thereon similar gears K′ and L′, the connections N, P, N′ and R′ leading from said gears J and K and suitably secured, and connections leading from said gears H and L and adapted to operate a signal-arm, switch, &c., substantially as described.

8. In a compensating device for railroad signals and switches, an operating-lever suitably fulcrumed, arms extending laterally therefrom, a pair of gears mounted upon each arm, one of said gears being a stop-gear with a portion of its periphery recessed and having involuted and epicycloidal teeth, and hubs on the side, the other of said gear-wheels having teeth curving from the base of the tooth to the point, said latter gear having a sprocket-hub, a weighted chain passing over the same and adapted to operate a switch or signal-arm, in combination with means for releasing in case of contraction and for taking

up slack in case of expansion, substantially as described.

9. In a compensating device, an operating-lever fulcrumed upon a suitable support, a set of gears mounted thereupon, one of the same being a stop-gear with a portion of its periphery recessed blank, and having an engaging tooth involuted on one side and epicycloidal on the other, a gear adjacent said stop-gear having teeth curving on both sides from their base in a sharp point, said gears being adapted to mesh with each other and mounted upon an arm of said lever on one or both sides of its fulcrum, in combination with suitable connections from said gears adapted to operate a signal-arm or switch substantially as described.

10. In a wire-compensator for railroad signals, switches, &c., a yoke having suitably mounted thereon, a gear-wheel provided with a sprocket-hub, a stop-gear journaled in said yoke adjacent said wheel, and having a portion of its periphery recessed blank, and provided with grooved hubs, connections from said hubs to adjustable fixed points, and a weighted chain passing over said sprocket-hub, said gears being adapted to be out of mesh when in their lowest position, thereby allowing said wheel with the sprocket-hub to revolve independently of its adjacent gear, and thus allow the weight of said chain to compensate for expansion or contraction, substantially as described.

11. In a wire-compensator for railroad signals, switches, &c., an operating-lever suitably fulcrumed, a laterally-extending arm having mounted thereon intermeshing gears, certain of said gears being blank for a portion of their periphery, and connections common to the other gears adapted to operate a signal-arm, switch, &c., in combination with a connection from one of said recessed gears to an eyebolt mounted in an angle-bar secured to an opening in the floor, and having a chisel-point, and a second connection to an adjustable fixed point below, substantially as described.

12. In a wire-compensator, yokes suitably supported having gears mounted thereon, provided with grooved hubs and sprocket-hubs respectively, a continuous chain engaging said sprocket-hubs and carrying a weight, said chain being adapted to actuate a switch, signal-arm, &c., in combination with connections from said grooved hubs to fixed points, and means for releasing said chain in case of contraction and for taking up slack in case of expansion, substantially as described.

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