

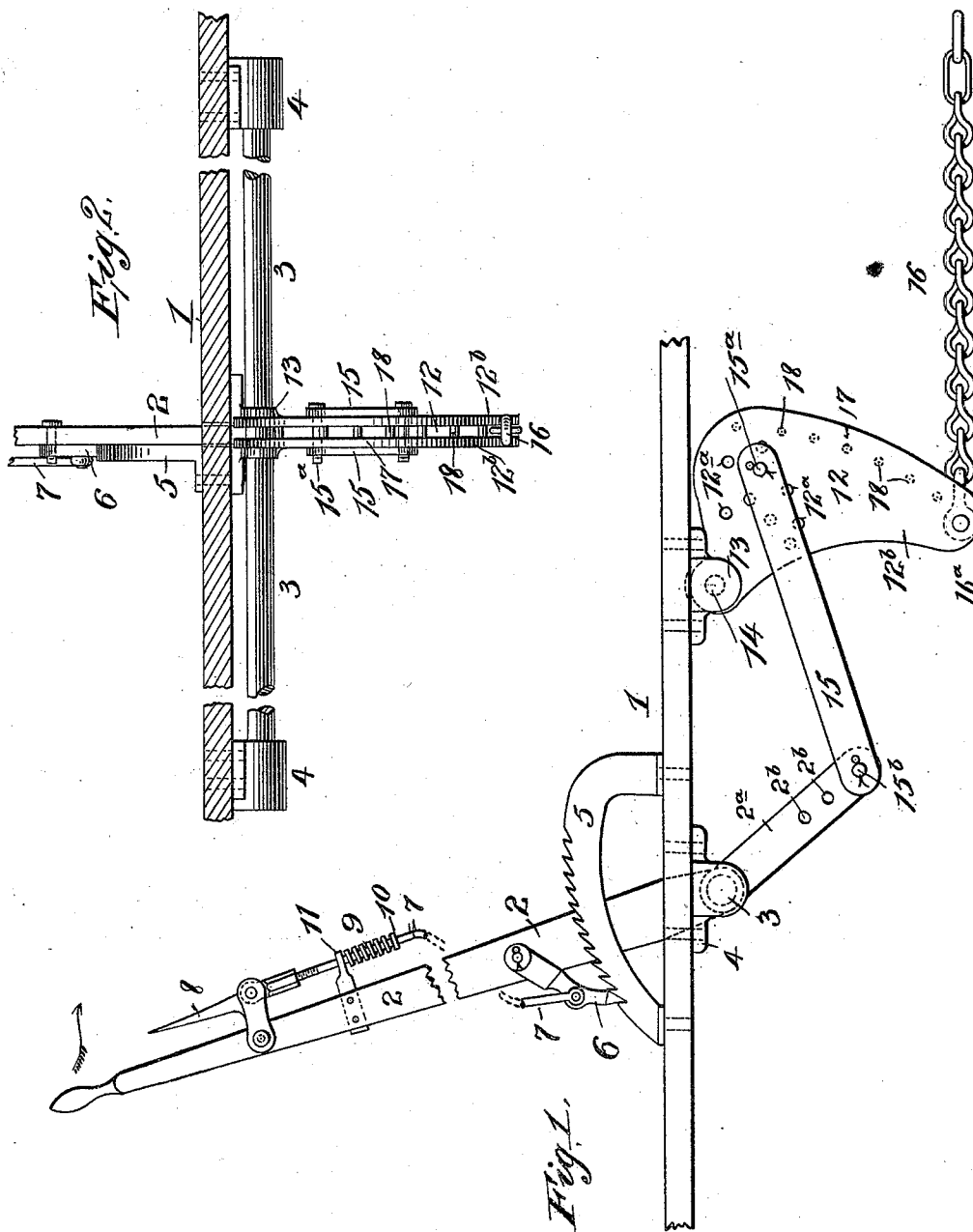
(No Model.)

2 Sheets—Sheet 1.

J. A. BRILL.
DIFFERENTIAL BRAKE LEVER.

No. 554,234.

Patented Feb. 11, 1896.



WITNESSES:

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INVENTOR

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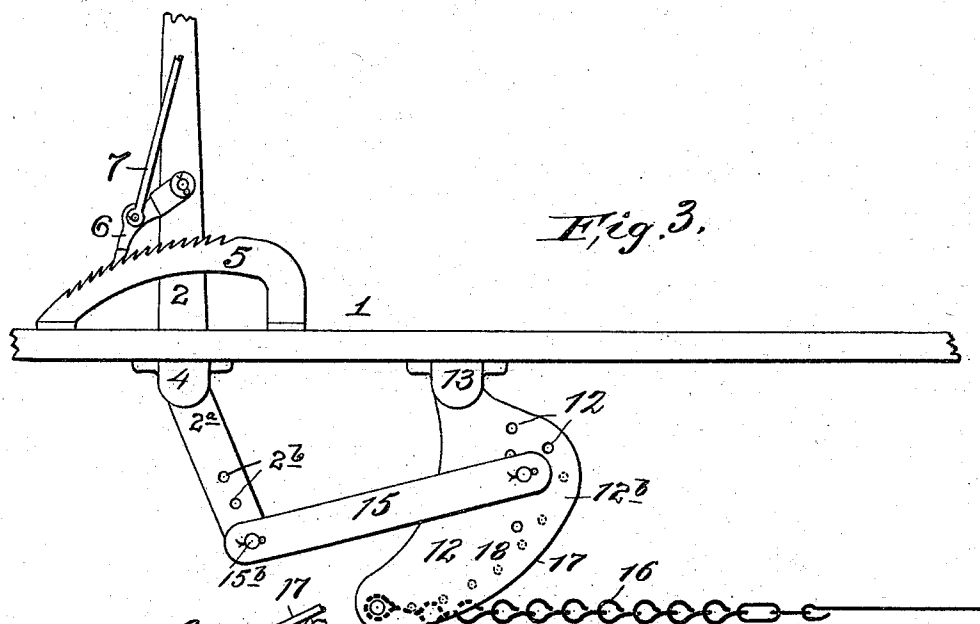


Fig. 3.

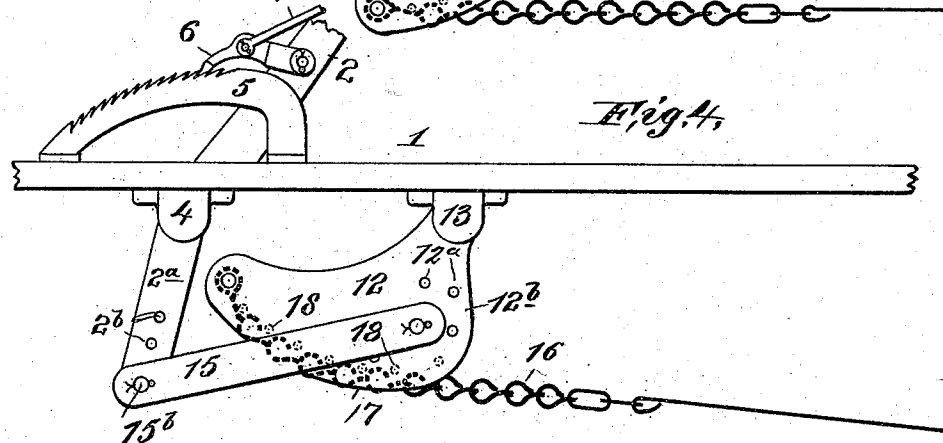


Fig. 4.

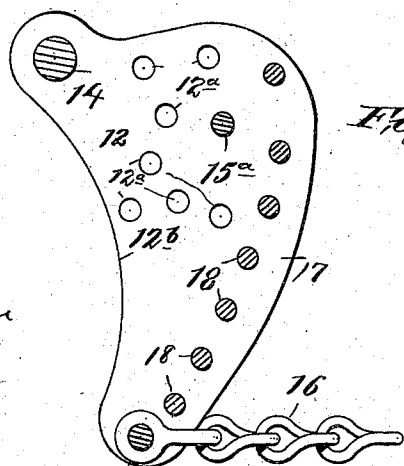


Fig. 5.

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JOHN A. BRILL, OF PHILADELPHIA, PENNSYLVANIA.

DIFFERENTIAL BRAKE-LEVER.

SPECIFICATION forming part of Letters Patent No. 554,234, dated February 11, 1896.

Application filed September 25, 1895. Serial No. 563,617. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. BRILL, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Differential Brake-Levers, of which the following is a specification.

This invention is applicable for use in applying brakes on cars, and for operating the grips of cable cars, as well as for other purposes where pulling effects are to be utilized, and the object of the invention is to enable an operating-lever to be moved through a comparatively small space while developing as much power as possible, at the same time giving a large movement to the power-transmitting element or member of the mechanism.

The invention consists, among other things, of the combination of an oscillatory lever connected by a link to an eccentric and oscillatory lever at a point between the pivot of the latter and its point of transmission of power. By this means the power-transmitting arm of the main operating-lever can be made quite short, while the movement of the second-mentioned lever can be considerable to give the desired amount of draft to the part to be operated, such as the brake-beam of a car-braking mechanism or the grip of a cable car.

The invention also consists in an oscillatory lever, a link connected therewith, a lever composed of two plates connected together by studs, and also connected with said link, and a chain or other connection connected with the outer end of said second-mentioned lever, said studs being placed eccentrically to the pivot of said lever, so that as the latter swings the chain will bear on said studs at points gradually approaching the pivot of said lever.

The invention further consists in the novel details of improvement and the combinations of parts, that will be more fully hereinafter set forth and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming part hereof, wherein—

Figure 1 is a side elevation of my improved mechanism as applied to a car. Fig. 2 is an edge view thereof, partly broken away. Figs. 3 and 4 are side views showing the parts in

different positions; and Fig. 5 is an enlarged detail view, partly in section, of the secondary lever of the mechanism.

Referring now to the accompanying drawings, in which similar numerals of reference indicate corresponding parts in the several views, the number 1 indicates the platform or flooring of a car or any other suitable support, and 2 is a lever pivotally carried thereby so as to oscillate. The lever 2 is shown as secured to a rack-shaft 3 journaled in bearings 4 4, carried by the platform or support 1, and the short arm 2^a of lever 2 is shown projecting downwardly from the shaft or pivot 3 beneath the platform or support 1. It is evident that the long and short arms of the lever 2 can be in one piece suitably pivoted, as by the shaft 3, or that they may be in separate pieces suitably secured to the shaft or pivot 3.

At 5 is a rack-segment carried by the platform or support 1 to be engaged by a dog 6, pivotally carried by lever 2, the dog 6 being arranged to be drawn out of engagement with the rack 5 by a rod 7 leading to a hand-grip 8 pivotally carried by the lever 2, a spring 9, coiled on the rod 7 and bearing at one end against a stop 10 on said rod and at its other end against a guide-bar 11 carried by lever 2, serving to normally hold the dog 6 in engagement with the rack 5.

I prefer to arrange the pitch of the rack eccentric to the fulcrum of the lever 2, as shown. The arm 2^a of the lever is inclined rearwardly. The object of this is to permit the lever to be moved rapidly at the beginning of the swing, the corresponding movement of the link 15 increasing as the direction of said link becomes less oblique to the direction of the arm 2^a. The link, and therefore also the secondary lever 12, moves faster for a corresponding angular movement of the arm 2^a until said link is at right angles to said arm, which occurs just before the end of the swing. This arrangement allows of the lever being very rapidly started and swung backward as it reduces the initial inertia which has to be overcome. At the same time, the obliquity of the link 15 to the arm 2^a at the terminal position, as seen in Fig. 4, gives an increase of pressure on the brakes for a given pressure on the lever 2.

At 12 is a secondary lever which is shown pivotally supported by a bracket or bearing 13, carried by the platform or support 1, the lever 12 turning on a pivot or gudgeon 14. The arm 2^a of the lever 2 is pivotally connected by links 15 with the lever 12 at a point between the pivot 14 and the free end of lever 12. To the free end of the lever 12 is pivotally connected a chain or other suitable connection 16, which may extend to a suitable part of a brake mechanism or cable-grip, or to any other device to be operated by the pull of the chain or connection 16.

The pivot-pin 15^a, which connects the link 15 with lever 12, is shown located in an aperture 12^a in lever 12 at a point nearer the pivot 14 than the outer end of lever 12, so that as lever 2 is operated the free end of lever 12 will be given more movement than the lower end of arm 2^a of lever 2. The lever 12 is shown provided with a number of apertures 12^a, which are at one side of a line drawn through the pivots 14 and 16^a, so that the pivot 15^a of link 15 can be adjusted to different positions on the lever 12 to give the outer end of the latter more or less movement, as circumstances may require. The arm 2^a of lever 2 is also shown provided with several apertures 2^b for the pivot 15^b to enable the link 15 to be adjusted more or less near the pivot 3 to enable more or less lever-power to be applied to lever 12.

The lever 12 is substantially a bell-crank lever having a short arm connected with the link 15 and a long arm connected with the chain 16, said lever 12 being of the novel construction shown in order to provide greater capability of adjustment and furthermore to provide an eccentric bearing-surface for the chain 16 as the lever 12 is vibrated.

With the parts arranged as above described when the lever 2 is moved in the direction of the arrow in Fig. 1 the short arm 2^a draws the link 15 which in turn draws the lever 12, swinging it on its pivot 14, thereby causing its pivot 16^a to move through a greater space than the lower end of arm 2^a. By this means I am enabled to use a much shorter arm 2^a for lever 2, to obtain a certain amount of draft on chain 16, than could be done if chain 16 were connected directly to arm 2^a, and the proximity of pivot 15^b of link 15 to pivot 3 causes an increased amount of lever-power to be transmitted to lever 12. By this means the amount of movement necessary to be given to the upper end of lever 2 to effect a certain pull on chain 12 is also reduced, so that a brake or grip can be set quicker than by the ordinary arrangement of levers known to me.

The main operating edge 17 of lever 12 is shown arranged on a curve that is eccentric to the pivot 14 of said lever, so that as the lever 12 is operated it will work on the chain 16 with gradually-decreasing leverage to impart gradually-increasing power to said chain. For this purpose I preferably make

the lever 12 of two plates 12^b 12^b, which are connected together along the edge 17 by studs 18. (See Fig. 5.) The links 15 are also made in pairs which straddle the plates 12^b of lever 12 as well as the arm 2^a. (See Fig. 2.) With this arrangement as the lever 12 turns to draw the chain 16 the links of the chain will gradually encounter the studs 18, (see Figs. 3 and 4,) whereby the drawing strain will be applied to said links, and as the studs 18 gradually approach the pivot 14 the length of leverage applied to the chain will be gradually decreased, whereby increased power will be gradually applied to the chain. By this arrangement the first movement of lever 12 will be quite rapid, which will have the effect of first taking up the slack in the chain, and of then applying power thereto proportional to the difference in the lengths of the arms of the levers, together with a proportional decrease in the proportion of the movement of the lever 2 to that of the lever 12.

By omitting the studs and otherwise forming the lever 12 a rod could be substituted for the chain 16 with the same differential leverage effect.

It is apparent that my invention can be embodied in a structure differing from that shown and described herein without departing from the spirit of the same.

Having now described my invention, what I claim is—

1. The combination of the primary lever having a long and a short arm, a link connected with the short arm, and an oscillatory lever to which the link is pivotally connected at a point at one side of a line drawn through the pivot of said lever and the resistance end thereof, substantially as described.

2. The combination of the primary lever having a long upper or power arm and a short lower arm, the latter extending obliquely to the power-arm, a link connected with the short arm, and an oscillatory lever with the short arm of which said link is pivotally connected, substantially as described.

3. The combination of the primary lever fulcrumed between its ends and having a long arm above and a short arm below its pivot, a pivoted secondary lever, a power-transmitting device secured to the free end of the secondary lever, and a link secured to the short arm of the primary lever and to the secondary lever eccentrically of its pivot and at a point nearer the pivot than its resistance end, substantially as described.

4. The combination of the primary lever fulcrumed between its ends and having a long arm above and a short arm below its pivot, said short arm extending obliquely to the long arm, a pivoted secondary lever, a power-transmitting device secured to the free end of the secondary lever, and a link secured to the short arm of the primary lever and to the secondary lever eccentrically of its pivot and at a point nearer the pivot than its resistance end, substantially as described.

5. The combination of the primary lever having a long arm and a short arm, an oscillatory lever, and a link connected adjustably with the primary lever and also adjustably with the oscillatory lever outside a line drawn through the pivot of said lever and the resistance end thereof, substantially as described.

6. The combination of an oscillatory lever and a link connected therewith, with another lever composed of two plates placed side by side and connected together by studs, and a chain connected with the free end of the lever between said plates, substantially as described.

7. The combination of an oscillatory lever and a link connected therewith, with another lever composed of two plates placed side by side and connected together by studs, said plates being provided with a plurality of pairs of apertures for adjustably connecting said link to said plates, and a chain connected to the free end of said lever, substantially as described.

8. The combination of an oscillatory lever and a link connected therewith with another lever composed of two plates placed side by side and connected together by studs, said studs forming a line eccentric to the pivot of the secondary lever, and a chain connected with the free end of said lever between said plates, and adapted to engage said studs, substantially as described.

9. The combination of the primary lever fulcrumed between its ends, with a pivoted secondary lever, said latter lever having one side formed with an eccentric face, a chain secured to the free end of the secondary lever, and a link secured to the resistance-arm of the primary lever and to the secondary lever between the latter's power end and pivot, substantially as described.

10. The combination of a platform or support, a lever pivotally carried thereby and having its short arm extending below it, a rack and dog, and means for operating said dog, with a link connected with the short arm of said lever, an oscillatory lever also carried by said platform or support and fulcrumed at its upper end, and a chain or connection at the free end of said latter lever to transmit

power, said lever being connected with said link at a point between the fulcrum and free end of the lever, substantially as described.

11. The combination of an oscillatory lever and a link connected therewith, with another oscillatory lever connected therewith, and a chain or connection connected with the free end of said latter lever, one side of said lever being formed on a curve which is eccentric to the pivotal point of said lever so as to bear on said chain or connection at gradually-decreasing distances from the fulcrum, substantially as described.

12. The combination of an oscillatory lever and a link connected therewith, with another lever composed of two plates placed side by side and connected together by studs extending along one edge, and a chain connected with the free end of said lever to bear on said studs, substantially as described.

13. The combination of an oscillatory lever and a link connected therewith, with another lever composed of two plates placed side by side and connected together by intermediate studs, one edge of said lever being formed on a curve that is eccentric to the fulcrum of the lever, said studs following the eccentric curve of said lever, said lever being connected with said link, and a chain connected with the free end of said lever so that its links will bear on said studs as the lever turns, and as for the purposes specified.

14. The combination of a lever, a link connected therewith and composed of two parallel bars straddling said lever and another lever composed of two plates placed side by side and connected by studs, said link straddling said lever and pivotally connected therewith, and a chain connected with the free end of said lever so as to bear on said studs as the lever turns, substantially as and for the purposes specified.

Signed at Philadelphia, in the county of Philadelphia and State of Pennsylvania, this 23d day of September, 1895.

JOHN A. BRILL.

Witnesses:

R. S. REED,
C. MARBIL STRANGE.