

(No Model.)

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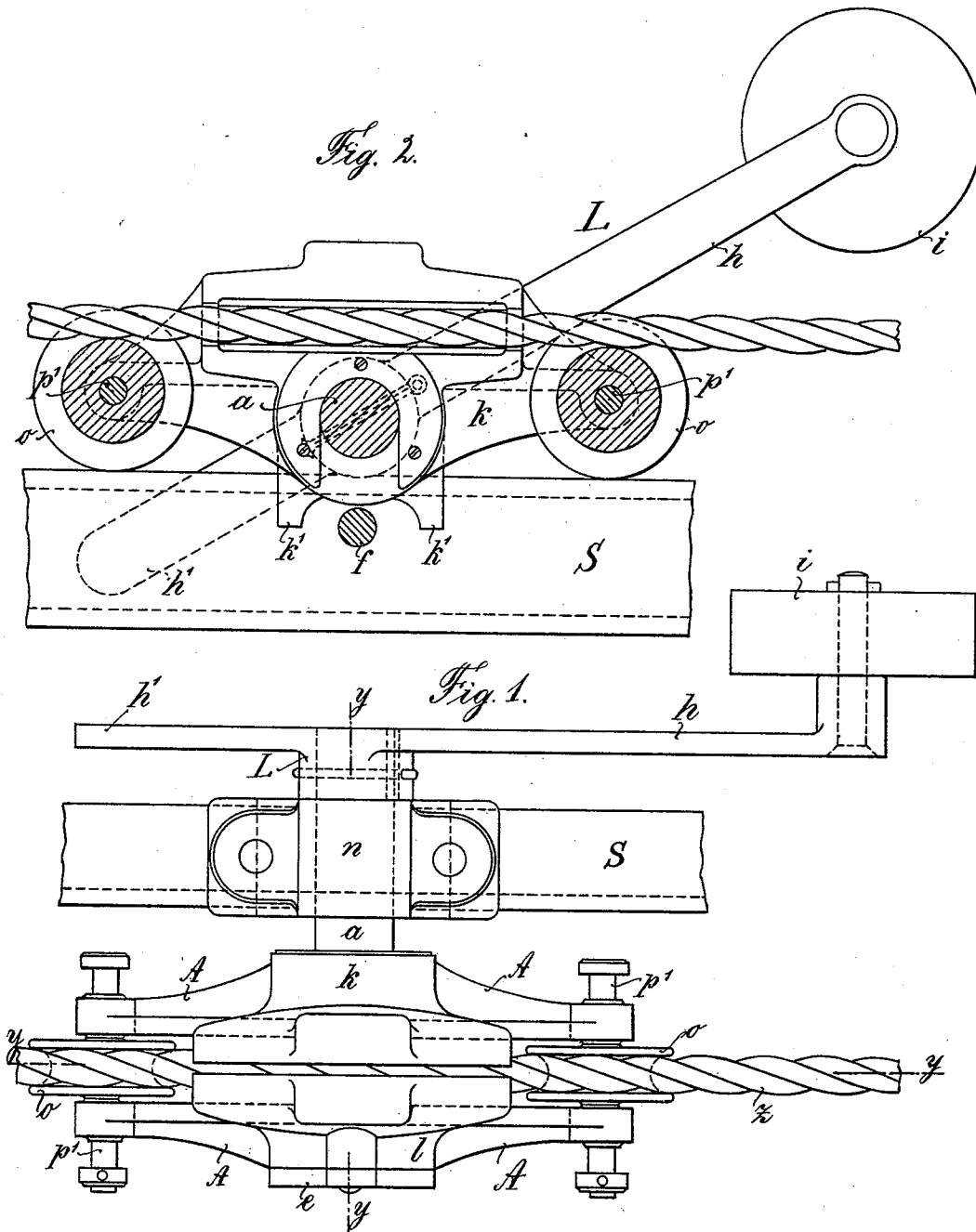
T. OBACH, Dec'd.

H. ORTH, Administrator.

CABLE GRIP.

No. 582,675.

Patented May 18, 1897.



Witnessed,
B. S. D. A. L.
W. J. L. Higgins.

Inventor
H. Orth, Administrator
of the estate of
Theobald Obach,
Deceased.

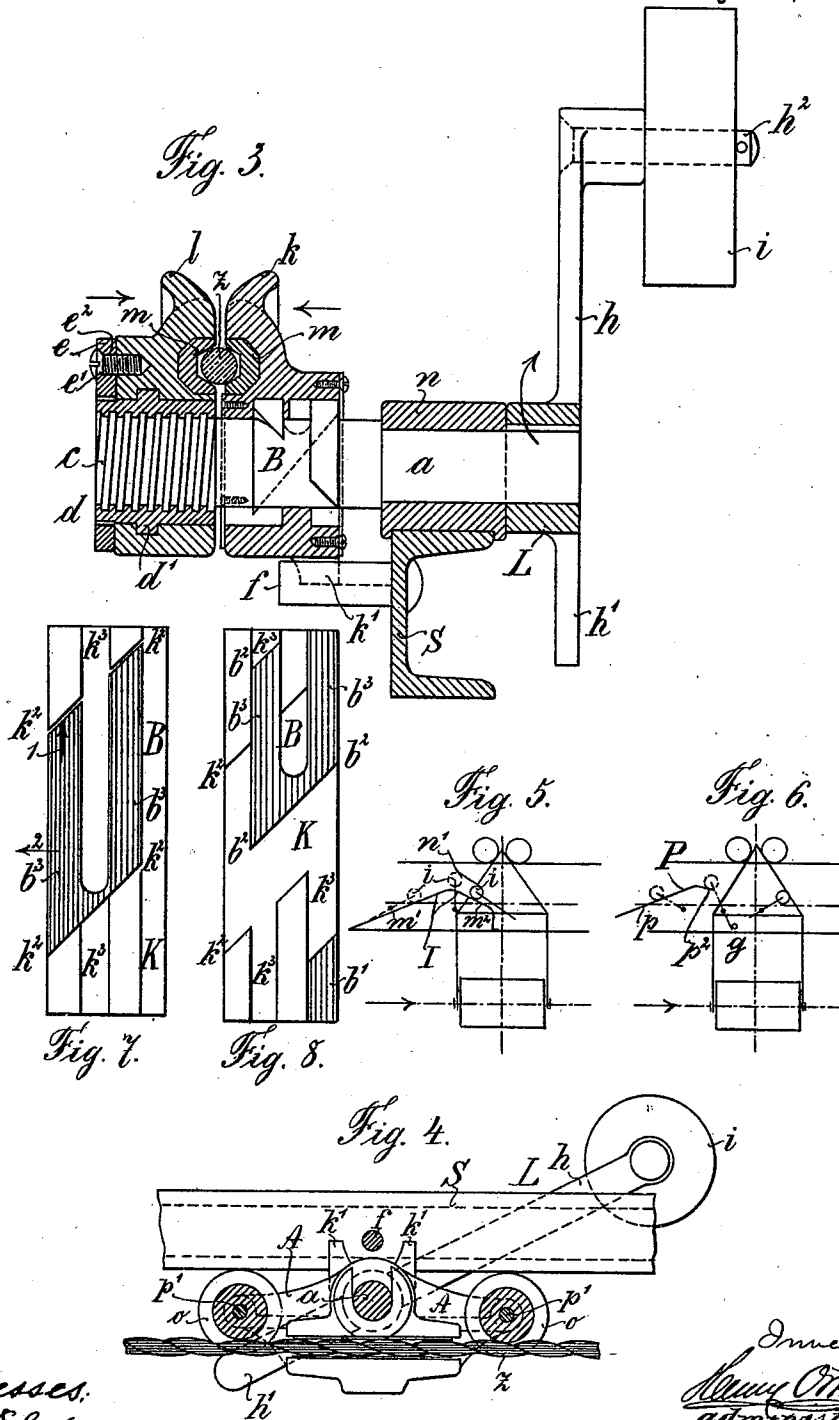
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UNITED STATES PATENT OFFICE.

HENRY ORTH, OF WASHINGTON, DISTRICT OF COLUMBIA, ADMINISTRATOR
OF THEOBALD OBACH, DECEASED.

CABLE-GRIP.

SPECIFICATION forming part of Letters Patent No. 582,675, dated May 18, 1897.

Application filed July 17, 1896. Serial No. 599,585. (No model.) Patented in Norway June 8, 1895, No. 4,611; in Belgium June 8, 1895, No. 115,990; in France June 8, 1895, No. 248,027; in Luxemburg June 9, 1895, No. 2,315, and in Spain September 29, 1895, No. 17,566.

To all whom it may concern:

Be it known that I, HENRY ORTH, of Washington, District of Columbia, am the administrator of the estate of THEOBALD OBACH, late of Vienna, Austria-Hungary, who invented certain new and useful Improvements in Cable-Grips, (for which Letters Patent have been obtained in Norway, No. 4,611, dated June 8, 1895; in Belgium, No. 115,990, dated June 8, 1895; in France, No. 248,027, dated June 8, 1895; in Luxemburg, No. 2,315, dated June 9, 1895, and in Spain, No. 17,566, dated September 29, 1895,) of which the following is a specification.

This invention has relation to cable-grips, and more particularly to grips employed on vehicles adapted to be propelled along an overhead or aerial cable line.

The gripping devices for the vehicles of overhead-cable lines have heretofore been rigidly connected with the vehicle or carriage; so that an abnormal strain is exerted upon the traction-cable and gripping devices at the slightest deviation of said traction-cable or of the suspension-cable, or both, in a plane at right angles to the plane of travel. On the other hand, the moving of the gripping-jaws suddenly into contact with the traction-cable, as is generally the case in overhead lines in which the coupling and uncoupling is effected automatically, results not only in an abnormally sudden strain on the traction-cable and grip, but in an unnecessary jarring or jerking of the vehicle itself. This is due not only to the sudden action of the grip on the traction-cable, but also to an excess of reciprocal motion of the gripping appliances, and consequently a pressure upon the cable far greater than is actually necessary to firmly connect the vehicle thereto.

The object of this invention is to obviate the disadvantages above referred to by providing, on the one hand, a pivotal connection between the gripping appliances and the vehicle so arranged that the said appliances can swing or rock in the direction of travel of the traction-cable, and, on the other hand, by providing the necessary means whereby

the reciprocal movement of the gripping-jaws is effected in such manner that one of the jaws will have a rapid and the other a slow motion, and that the motion of the rapidly-moving jaw will be stopped before the final or gripping pressure is applied and so that the said final or gripping pressure is applied by the slowly-moving jaw.

The invention has for its further object the provision of means whereby the extent of reciprocal motion of the gripping-jaws relatively to the traction-cable may be adjusted in accordance with the diameter of such cable.

By the means above described, as will be readily understood, the grip upon the propelling-cable is not a sudden but a gradual one, while an excessive pressure on the cable cannot take place, since the movement of the gripping-jaws toward each other is limited in accordance with the thickness of such cable.

The object of causing one of the jaws to move rapidly is to lessen the time required to apply the grip, and where such motion is imparted by screw-threaded appliances to lessen the degree of rotation of one of the screw-threaded elements.

The excessive wear of the grips, due to friction, is another feature that involves considerable expenditure in keeping the grips in working order.

A further object of the invention is to reduce this expenditure to a minimum by providing the gripping-jaws with a movable bushing or lining, but that the invention may be fully understood the same will be described in detail, reference being had to the accompanying drawings, in which—

Figure 1 is a top plan view of a cable-grip embodying the aforesaid invention. Figs. 2 and 3 are sections taken, respectively, on lines *x x* and *y y* of Fig. 1. Fig. 4 is a view similar to Fig. 2, showing the gripping appliances arranged to take a cable below the same instead of above, as in Figs. 1 to 3. Figs. 5 and 6 are diagrammatic views illustrative of the mode of coupling and uncoupling the vehicles automatically to and from the traction-cable; and Figs. 7 and 8 illustrate the screw-

threads of the rapidly-moving jaw and its operative spindle developed in coupling and uncoupling, respectively.

Similar symbols of reference indicate like parts wherever such may occur in the figures of drawings above described.

In the drawings, S indicates the rail on the carriage or vehicle, from which the gripping appliances are supported. This rail may be secured to the vehicle and support the gripping appliances to act on a traction-cable arranged above the gripping appliances, Figs. 1, 2, and 3, or below the same, Fig. 4, and said rail has secured thereto or formed thereon a bearing n for an actuating-spindle a , in which bearing said spindle is free to revolve, the spindle carrying, as usual, the gripping-jaws k and l and the shifting or actuating lever L.

By means of the described arrangement of spindle and bearing a pivotal connection is provided for the coupling appliances, on which they are free to vibrate or swing, and thus adapt themselves automatically to any deviation in the traction-cable z .

The lever L is a two-armed lever, whose longer arm h has a laterally-projecting pin or stud h^2 , on which is loosely mounted a discoidal weight i , that serves to move the lever in coupling and uncoupling, as will herein-after appear, and hold the gripping-jaws with the required pressure to the traction-cable z .

The gripping-jaws k and l are each provided with an internally-screw-threaded bearing for the reception of externally-screw-threaded portions on the actuating-spindle a , the screw-threaded portions having right and left hand threads, respectively, so as to impart reciprocal motion in one or the other direction to the gripping-jaws according as the spindle a is revolved in one or the other direction.

In order that the sudden gripping of the traction-cable by the jaws in coupling a vehicle to such cable may be avoided, the jaw k is provided with a screw-thread of very great pitch as compared with the pitch of the screw-thread in the spindle-bearing of jaw l , the spindle a having correspondingly-threaded portions B and C. The screw-thread in jaw k and the corresponding thread B on spindle a are so arranged as not only to cause said jaw to move rapidly toward or from jaw l , but to limit the movement of jaw k in either direction, as will be readily understood by reference to Figs. 7 and 8, which illustrate the threaded bearing in jaw k and the threaded portion B on spindle a developed and in their extreme relative positions—that is to say, when the jaws are open and closed, respectively, the shaded portions B indicating the thread on spindle a and the other portions K the thread in bearing of jaw k . The pitch of the screw-thread B on spindle a is indicated at $b^2 b^3$ and that of the screw-thread in jaw k by $k^2 k^3$.

In the open position of the jaws, Fig. 7, K has moved to the right or away from jaw l ,

while in the closed position, Fig. 8, K has moved toward the left, hence toward jaw l .

In closing, pressure is exerted by the screw-thread B in the direction of arrow 1, Fig. 7, upon the upper edge $k^2 k^3$ of screw-thread K, which has for its result to move the jaw k in the direction of arrow 2, Fig. 7, until the parallel members $b^3 b^3$ of the forked portion of the thread B on the spindle a enter into the parallel grooves $k^3 k^3$, Fig. 8, in the thread K of jaw k , when said jaw will remain stationary, while jaw l will still move toward jaw k . From Figs. 7 and 8 it will readily be seen that the screw-threads B and K are partial threads only, so arranged as to limit the motion of jaw k in either direction.

Inasmuch as the thread of the cooperating screw-threaded parts that impart motion to the jaw l is of a very low pitch as compared with the pitch of the screw-thread of the cooperating screw-threaded parts which impart motion to jaw k , said jaw l will move much more slowly, thereby gripping the cable with a gradually-increasing pressure until the maximum or traction pressure has been attained. This maximum or traction pressure is of course determined by the amplitude of rotation of the spindle a , while the latter is determined by the amplitude of vibration of the lever L.

In order that the reciprocal motion of the gripping-jaw l may be adjusted to the diameter of the traction-cable z and thereby avoid undue pressure on said cable, the screw-thread for jaw l , instead of being formed in a bearing in the jaw, is formed in a sleeve or nut d , that is free to revolve in said bearing and is held against endwise motion in any suitable manner, as by means of a segmental peripheral flange or flanges d' on the sleeve or nut fitting a corresponding groove in its bearing.

In order that the nut may be screwed to the end of the spindle a , there is provided a segmental way or ways in the outer face of the sleeve or nut bearing corresponding with the segmental flanges or keys d' on said nut and leading to the peripheral locking-groove in the inner face of said bearing, the parts forming what may be termed a "bayonet-joint;" and in practice the locking-plate e is preferably provided with segmental projections fitting into said keyways to prevent the accidental endwise displacement of the nut d . These joints are so universally known that it is deemed unnecessary to illustrate the arrangement in detail.

It is obvious that by revolving the nut d in its bearing the extent of motion of the gripping-jaw l can be regulated to suit the diameter of the traction-cable, the gripping appliances being of course arranged relatively to the cable in accordance with the amplitude of motion of jaw k toward such cable, the nut being held against rotation after adjustment by a lock-plate e , seating on the outer end of the nut, which is of polygonal outline for the

purpose, said lock-plate being secured to the jaw *l* in any suitable manner, as by means of one or more set-screws *e'*, extending through a segmental slot or slots *e²* in said lock-plate.

5 In order to avoid wear of the gripping-jaws *k* and *l*, the traction-cable, instead of being gripped directly by said jaws, is gripped by a lining or bushing for such jaws, as by means of bushes *m*, the proximate faces of which are preferably provided with polygonal recesses for the purpose of affording a better hold on the cable, said bushes being also of polygonal form in cross-section, fitting a corresponding seat in their respective jaws *k* and *l*.

15 As hereinbefore stated, the gripping appliances are pivotally connected through the actuating-spindle *a* with the vehicle, and to prevent the appliances from swinging down out of reach of the traction-cable the jaw *k* is provided with downwardly-projecting lugs adapted to abut against a fixed abutment, as a pin *f*, Figs. 2, 3, and 4, thereby limiting the amplitude of vibration of the jaws and maintaining the same within reach of the traction-cable *z*. This is furthermore insured by means of two cable-pulleys *o*, loosely mounted on spindles or pins *p'*, having bearing in arms A, projecting laterally from the jaws *k* and *l*, as clearly shown in Fig. 1.

30 If required, the position of the gripping appliances may be reversed, as shown in Fig. 4.

The coupling of a vehicle to and the uncoupling of the same from its traction-cable *z* is effected by a displacement of the shifting-lever L from right to left, or vice versa, and the pitch of the screw-thread in the jaw *l* or its inserted nut *d*, in which the screw-threaded portion *c* of the actuating-spindle *a* works, is such that a rotation of the shifting-lever 40 through an arc of about ninety degrees in one or the other direction will effect the coupling or uncoupling, which operations are effected automatically through the medium of instrumentalities which are diagrammatically illustrated in Figs. 5 and 6.

45 The uncoupling is effected, as shown in Fig. 5, by means of a fixed reverse incline I, over which the circular or discoidal weight *i* on lever L runs as the vehicle travels in the direction of the arrow, the lever being first raised into a vertical position by the incline *m'*, at which time the said weight impinges upon the under side of a reversely-inclined directing-plate *n'*, the lever tilting over from left to right, its weight being guided between said plate *n'* and the incline *m²*. By the means described the lever L does not drop suddenly under the influence of its weight *i*, but is reversed gradually as the said weight runs down along incline *m²*. The speed of downward motion of the lever being controlled or determined by the speed of travel of the vehicle a sudden uncoupling can therefore not take place. Substantially the same operation takes place in coupling, except that after the lever has been raised to a vertical

position by the incline *p* of the reverse incline P, Fig. 6, thereby moving the jaw *k* to or approximately to its limit of motion toward the cable and jaw *l*, the latter is moved so as to barely grip the cable. The said lever remains for a short time in a nearly vertical position, or so long as the weight *i* thereof travels over the slight incline *p²*, thereby increasing the grip on the cable slightly by the slow continuation of the motion of jaw *l* toward jaw *k*. As the weight *i* reaches the end of the nearly horizontal incline *p²* the short arm *h'* of lever L strikes a fixed pin *g*, whereby as the vehicle is moved in the direction of arrow, Fig. 6, the lever is suddenly tilted over or reversed, the spindle *a* completing its partial rotation, thereby moving the jaw *l* to apply the final or traction pressure to the cable. This rectilinear movement of the jaw 85 *l*, as hereinbefore stated, can be limited in accordance with the diameter of the traction-cable by a proper adjustment of the nut *d*.

It will be understood that the herein-described invention is not limited to the exact details of construction and arrangement as shown and set forth, as these may be varied without departing either from the nature or spirit of said invention.

Having thus described the invention, what is claimed as new therein, and desired to be secured by Letters Patent, is—

1. The combination in a cable-road with the traction-cable, of a vehicle provided with a spindle-bearing and with a fixed abutment on a line with such bearing, cable-gripping appliances comprising two gripping-jaws and a spindle adapted to revolve in the bearing on the vehicle and impart reciprocal motion to the jaws in one or the other direction, one of said jaws provided with projections extending into the plane of the aforesaid fixed abutment on opposite sides thereof, for the purpose set forth.

2. A cable-grip comprising reciprocally-movable jaws provided with polygonal recesses, in combination with correspondingly-shaped grips or gripping-faces removably seated in said recesses, for the purpose set forth.

3. A cable-grip comprising reciprocally-movable jaws provided with polygonal recesses, in combination with correspondingly-shaped grips or gripping-faces removably seated in said recesses, said grips provided with a polygonal recess in their gripping-faces, for the purpose set forth.

4. A cable-grip comprising two gripping-jaws and a right-and-left threaded actuating-spindle working in correspondingly-threaded bearings in said jaws, the cooperative threaded parts being so constructed that one of the jaws will move more rapidly than the other when the spindle is revolved in one or the other direction, for the purposes set forth.

5. A cable-grip comprising two gripping-jaws and a right-and-left threaded actuating-

spindle working in correspondingly-threaded bearings in said jaws, the thread in one of the jaw-bearings and the corresponding thread on the spindle being such as to move one of the said jaws at a greater speed than the other and to limit the extent of motion of such jaw when the spindle is revolved in one or the other direction, for the purpose set forth.

6. A cable-grip comprising two gripping-jaws, means for imparting reciprocal motion thereto, and an adjusting device for adjusting the extent of reciprocal motion of one of the jaws, for the purpose set forth.

7. The combination with the gripping-jaw *k* provided with a partial right-hand screw-thread of high pitch, and the gripping-jaw *l* provided with an adjustable bearing having an interior left-hand screw-thread of low pitch, of the actuating-spindle *a*, having screw-threaded portions corresponding with the screw-threads of the jaws, and a lever secured to one end of said spindle, substantially as and for the purpose set forth.

8. The combination with the jaw *k*, provided with a bearing having a partial interior screw-thread, as *K*, of high pitch, the jaw *l* provided with a bearing, the adjustable nut *d* having an interior screw-thread of low pitch, said nut adapted to revolve in the jaw-bearing but held against endwise motion therein, and a locking device adapted to lock the nut against rotation, of the revoluble spindle *A* provided with screw-threaded portions *B*, *c*, working in the threaded bearings in the afore-

said jaws, substantially as and for the purpose set forth. 35

9. In a cable-road, the combination with the vehicle provided with a cable-grip comprising two gripping-jaws, a spindle adapted to impart reciprocal motion to said jaws, a two-armed shifting-lever, the longer arm of which has a laterally-projecting stud or pin and a discoidal weight revoluble on said journal, of the fixed reverse incline *I* and the guide-plate *n'* above the incline *m*² of said reverse incline, said parts in the path of the discoidal weight on the aforesaid lever, for the purpose set forth. 40 45

10. In a cable-road, the combination with the vehicle provided with a cable-grip comprising two gripping-jaws, a spindle adapted to impart reciprocal motion to said jaws, a two-armed shifting-lever on said spindle, the longer arm of said lever provided with a laterally-projecting stud or pin and a discoidal weight revoluble on said stud, of the fixed reverse incline *P* in the path of the aforesaid discoidal weight, and a fixed pin on one side of said reverse incline in the path of the short arm of the shifting-lever, substantially as and for the purpose set forth. 50 55 60

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Witnesses:

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