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T. H. MARS.

AUTOMATICALLY TRIPPING TROLLEY POLE MECHANISM.

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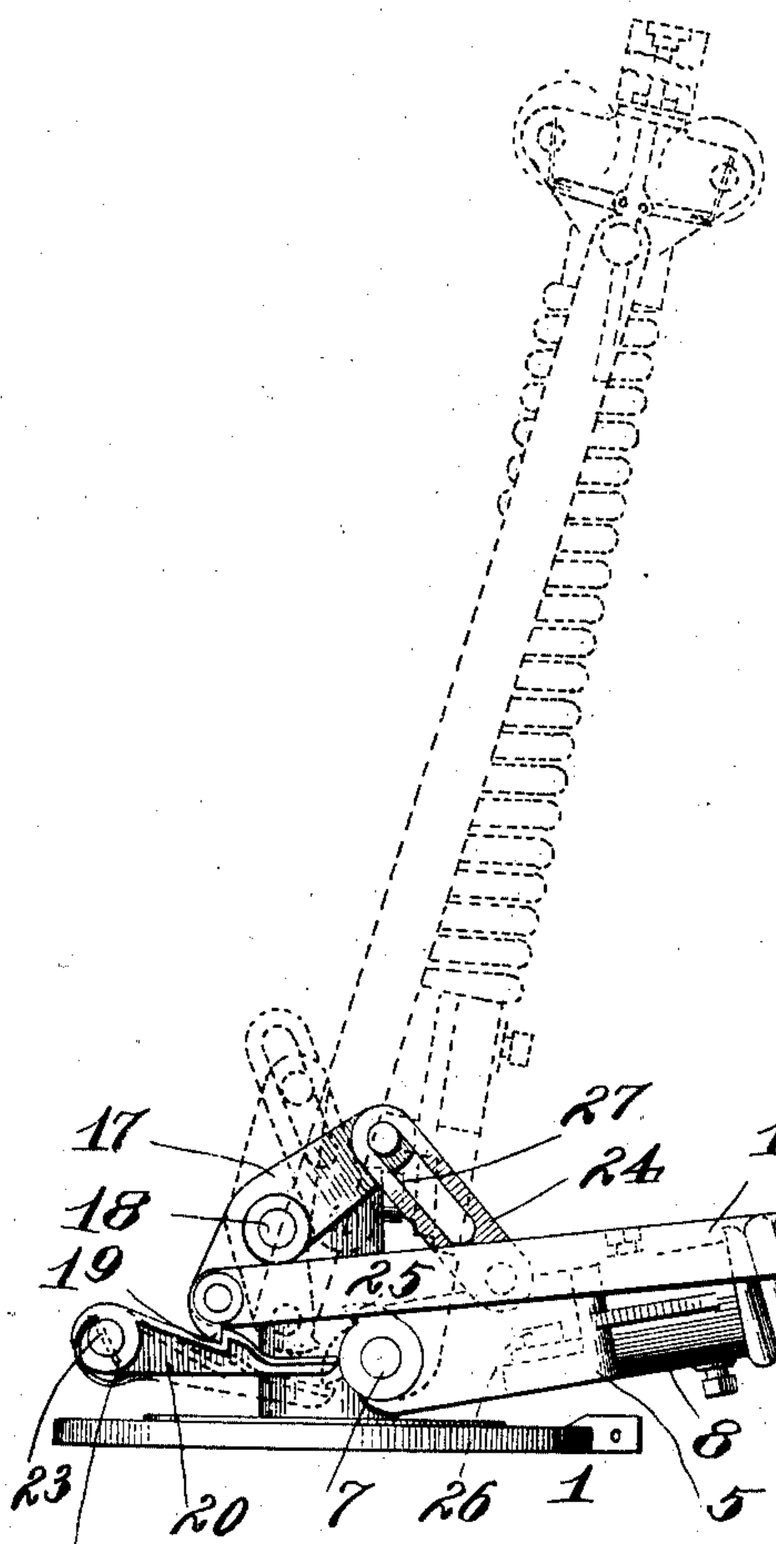

Fig. 1.

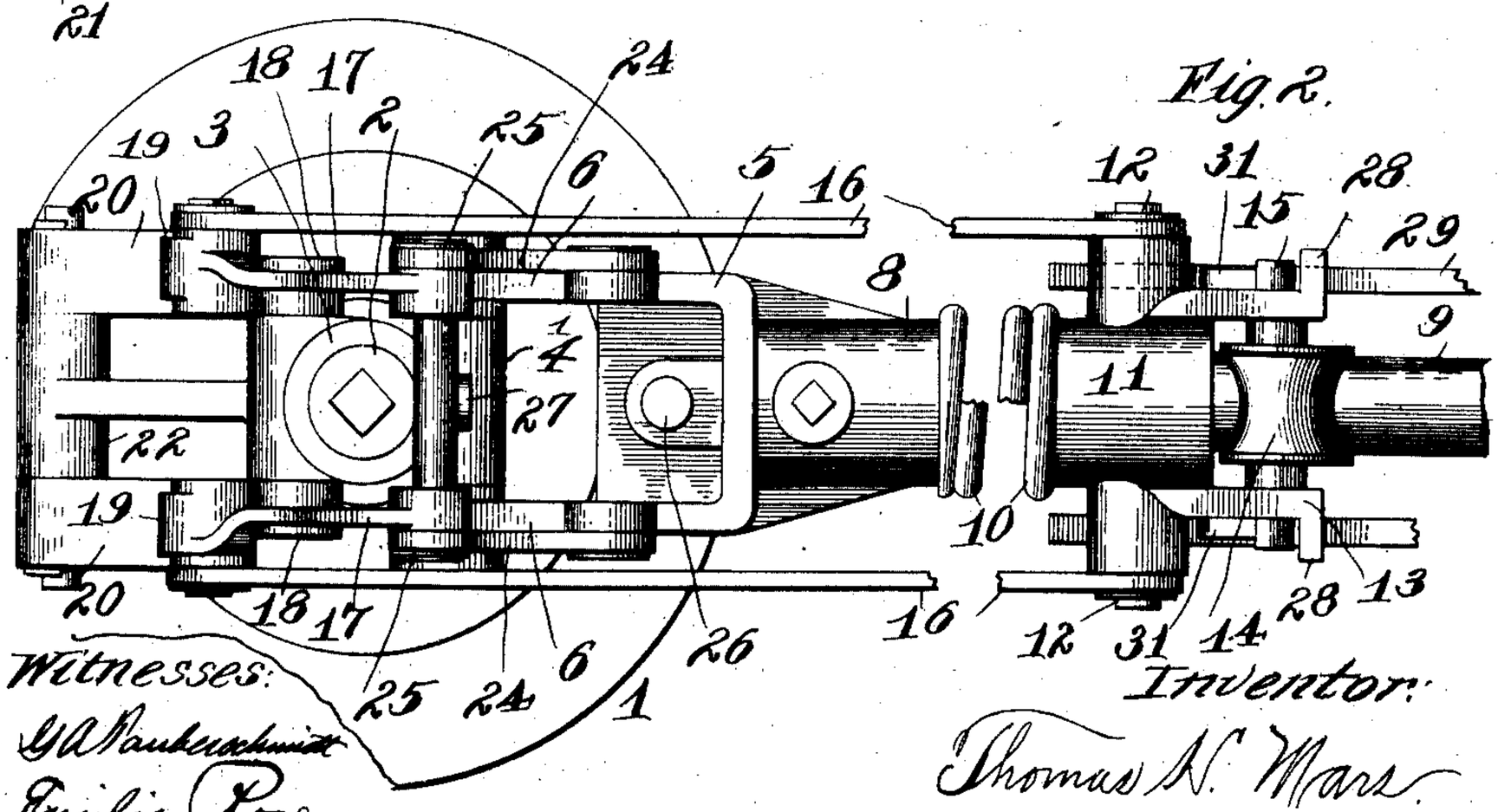

Fig. 2.

UNITED STATES PATENT OFFICE.

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AUTOMATICALLY-TRIPPING TROLLEY-POLE MECHANISM.

No. 883,217. Specification of Letters Patent. Patented March 31, 1908.

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To all whom it may concern:

Be it known that I, THOMAS H. MARS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Automatically-Tripping Trolley-Pole Mechanisms, of which the following is a specification.

This invention relates to improvements in automatically tripping trolley pole mechanisms of that character in which the disengagement of the trolley wheel from the trolley wire and consequent rising of the trolley pole under its tension spring or springs result in releasing the pole and permitting it to drop.

Among the salient objects of the invention are to provide a construction in which the main actuating spring of the trolley pole is partially tensioned during the descent of the trolley pole and serves as a cushion and buffer to arrest the downward descent of the pole; to provide in such a construction an improved leverage mechanism whereby the reëngagement of the tension links and restoration of the mechanism to normal working condition is effected by simply pulling the pole downwardly beyond the position in which it is arrested when falling, and this reëngagement is effected through the medium of improved leverage mechanism which relieves the pole of excessive bending stresses; to provide in such a mechanism improved means for preventing rebounding action of the pole under the tension of the actuating spring; to provide in such a mechanism means operating automatically to release the clutch which serves to prevent rebounding when the trolley is restored to its normal working condition; to provide a mechanism which is positive in its operations throughout; to provide a construction which is extremely compact and susceptible of being applied to trolley poles of conventional form; and in general to provide a simple and improved mechanism of the character referred to.

To the above ends the invention consists in the matters hereinafter described, and more particularly pointed out in the appended claims.

The invention will be readily understood from the following description, reference being had to the accompanying drawings, in which—

Figure 1 is a view showing in side elevation the base end of a trolley pole mechanism embodying the invention; Fig. 2 is a plan view, showing on a larger scale the parts shown in Fig. 1, intermediate portions of the main spring, pole and tension links being broken out to reduce the size of the figure.

Referring to the drawings, 1 designates as a whole a suitable base casting provided with a central upright pivot stud 2 upon which is rotatably mounted a turret casting 3. The turret casting is provided at one side with a transverse rib or projection 4, the opposite sides of which are embraced by arms 6, 6, of a main yoke 5, which latter is pivotally secured to the casting by means of a pivot pin 7 extended through the yoke and interposed projection 4. The outer end of the yoke forms a socket 8 within which the base end of the trolley pole, designated as a whole 9, is rigidly seated.

Around the trolley pole, and with one end resting against the end of the socket, is arranged a main expansion spring 10; the opposite end of which engages and actuates a collar 11 slidably mounted upon the pole. The collar is provided with diametrically opposite studs 12, and also with ear-like extensions 13 at each side. Between each pair of ears 13 is journaled an eccentric clutch roller 14; these rollers being provided with rigid trunnions 15 which extend outwardly through and somewhat beyond the ears 13 and which are located eccentrically of the centers of the respective rollers, as seen clearly in Fig. 1. The rollers form parts of a friction clutch mechanism which will be hereinafter more fully described.

With the studs 12 are connected tension links 16 which extend downwardly to, and are pivotally connected with, the lower ends of a pair of trip levers 17. The levers 17 are fulcrumed between their ends on pivot studs 18 carried by the upper part of the turret casting, and the lower end of each lever 17 is provided with a hook 19 adapted to cooperate with a corresponding latch 20 pivotally supported below the lower end of each lever and held yieldably upward by means of a spring 21. The latches 20 are pivotally mounted upon a bracket-like extension 22 of the turret casting; the two latches being desirably rigidly united with each other by means of a through pin 23 which extends through the bracket and forms their pivotal support.

The upper end of each lever 17 is connected with the corresponding arm 6 of the yoke 5

by means of links 24, and the connections between said links and the trip levers are slot-and-pin connections so as to afford a certain amount of lost motion between the movement of the trolley pole and the trip lever. The swinging ends of the latches 20 extend forwardly to a point adjacent to the pivoted ends of the corresponding yoke arms, and each yoke arm carries a tappet projection 25, which, when the trolley pole is elevated to a definite angle, encounter the respective latches and force the latter downwardly out of disengagement with the hooked ends of the trip levers 17. The angular position of the tappet projections is such that when the trolley is engaged with the wire in normal working position the tappets will be in close proximity to the latches, so that in case the trolley jumps the wire, and the pole rises, a slight further rise will throw off the latches.

In Fig. 1 the trolley pole is shown as oscillated to its uppermost limit of movement, and in this position it is arrested by means of a buffer projection 26 upon the central portion of the yoke, which buffer encounters a corresponding projection 27 formed upon the front face of the turret casting near the upper end of the latter.

Describing now the friction clutch mechanism hereinbefore mentioned, through one of the studs 12 and through a guide projection 28, formed as an integral extension of the ear-like extensions 13, is arranged to slide a shifter 29. To this shifter are pivotally connected two oppositely extending arms 30 carrying at their outer ends strap-springs 31 which are rigid with the respective arms and project substantially at right angles thereto. The ends of these arms extend through the trunnions 15 of the respective eccentric wheels, and the springs are shaped so as to exert a constant tension toward each other or toward the sides of the pole which the eccentric wheels encounter. The upper end of the shifter extends through one side of, and terminates within, a rectangular frame 32 adjustably and rigidly mounted upon the trolley pole; the shifter terminating in a head 33 which acts as a tappet to encounter either the lower wall 34 or the upper wall 35 of the frame 32, as will now be described. The tappet frame is so disposed relatively to the shifter that when the tappet head 33 engages the lower wall 34 the arms 30 will be inclined downwardly slightly from their pivotal axes, and when the tappet head encounters the upper wall 35 the arms 30 will be inclined upwardly slightly from their pivotal axis. In other words, in either position they will be shifted past their dead center as regards the inward thrust of the springs 31 so that they will remain set in the position in which they are left until mechanically shifted.

The operation of the mechanism as a whole will now be briefly described, as follows: Assuming the pole to be at its normal angle and the trolley engaging the wire, the friction clutch will be in position with the shifter thereof at its uppermost limit, holding the eccentric wheels out of engagement with the trolley pole and therefore permitting the main spring to operate freely. The end of the slot in the link 24 will in this position not encounter the stud of the trip lever 17. If, now, the trolley jumps the wire the pole will instantly rise under the action of the main spring, and in so doing the tappet projections 25 will encounter the respective latches 20 and release the latter from the corresponding trip levers 17, whereupon the leverage mechanism will assume the position shown in dotted lines in Fig. 1, in which position it will be noted the trip levers have swung inwardly at their lower ends toward the axis of the trolley pole and the trolley pole buffer has encountered the stop 27. During the rise from the normal working angle to the position at which the pole is arrested, the relative movement of the shifter 29 to the tappet frame 32 has caused the head 33 of the shifter to encounter the upper wall of said frame and effect the reversal of the friction clutch mechanism, placing it in condition to grip the pole when said clutch mechanism travels upwardly upon the pole. The disengagement of the latches from the trip levers, and the swinging of the links 16 inwardly with said levers, permit the pole to fall from its upright position towards the horizontal. As the pole descends, and after it has passed the normal working angle some distance, the swinging of the links 16 about their pivotal points of connection with the trip levers brings compressing tension upon the main spring so that the further descent of the pole is against an increasing tension on said spring. About the time the pole has arrived at an angle of approximately twenty degrees from the horizontal the spring has been compressed to such extent that it arrests the pole and tends to cause the latter to rebound. During the descent of the pole the friction clutch mechanism was inoperative for the reason that although the clutch wheels are in engagement with the respective sides of the pole the relative travel of the pole through the clutch mechanism was such as to rotate the wheels in the direction opposite that in which they would grip the pole. Now, however, when the pole tends to rebound, the relative travel of the clutch device and rotation of the wheels is such as to cause the latter to bite against the sides of the pole and thus lock the spring against expanding. This obviously prevents the pole from rebounding to any considerable extent. Thereupon the conductor seizes the cord connected with the upper part of the trolley pole and pulls the latter down manually to-

wards a horizontal position. In so doing he further compresses the spring, oscillates the trip lever 17 and restores them into latched engagement with their corresponding latches 20, and also, by reason of the further travel of the shifter relatively to the tappet frame, reverses the friction clutch mechanism and renders it inoperative so as to permit the pole to rise freely. Having thus reëngaged the controlling mechanism, as soon as he releases the tension on the cord the pole rises under the tension of the main spring and he adjusts the trolley to the wire as usual.

While I have shown and described what I deem to be a preferred embodiment of the invention, yet it will be obvious that the details thereof may be modified without departing from the spirit of the invention.

I claim as my invention:

1. In a trolley mechanism, the combination with a turret member and a pole pivoted thereon to oscillate vertically, of a trip lever pivoted between its ends on said turret member, a main spring, a part actuated by said main spring, a link connecting the spring-actuated part with one end of the trip lever, a link connecting the other end of said trip lever with the pole at a point removed from the pivotal axis of the latter, a latch with which the trip lever is adapted to engage, and a tappet member moving with the trolley pole and adapted to actuate the latch to release the trip lever.

2. In a trolley mechanism, the combination with a turret member and a pole pivoted thereon to oscillate vertically, of a trip lever pivoted between its ends on said turret member, a main spring mounted upon the pole and immovably confined at one end by a part of the pole, a shiftable member mounted upon the pole and actuated upon by the opposite end of said main spring, a link connecting said shiftable member with one end of the trip lever, a second link connecting the other end of said trip lever with the pole at a point between its pivotal axis and the shiftable member, a latch with which the trip lever is adapted to engage, and a tappet member moving with the trolley pole and adapted to actuate the latch to release the trip lever.

3. In a trolley mechanism, the combination with a turret member and a pole pivoted thereon to oscillate vertically, of a trip lever pivoted between its ends on said turret member, a main spring, a part shiftably mounted upon said pole and actuated by said main spring, a link connecting said shiftable member with one end of the trip lever, a lost motion link connection connecting the other end of said trip lever with the pole at a point removed from the pivotal axis of the latter, a latch with which the trip lever is normally engaged in operation, and a tappet member moving with the trolley pole and operating to release the latch when the pole rises to a predetermined angle.

4. In a trolley mechanism, the combination with a turret member and a pole pivoted thereon to oscillate vertically, of a tripping lever pivoted between its ends on said turret member, a main spring mounted upon the pole, a sliding member mounted upon the pole and actuated by said main spring, a link connecting the sliding member with one end of the trip lever, a second link connecting the other end of said trip lever with the pole, a latch with which the trip lever is normally engaged, a member moving with the trolley pole and adapted to actuate the latch to release the trip lever, and a friction clutch mechanism carried by said shiftable member and operating automatically to lock the main spring against movement during the upward movement of the pole in a position intermediate its limit of movement.

5. In a trolley mechanism, the combination with a turret member, and a pole provided at its lower end with yoke arms pivoted to opposite sides of said turret member so as to oscillate vertically, of a pair of trip levers pivoted between their ends at opposite sides of said turret member to move in planes parallel with the plane of movement of the trolley pole, a main expansion spring mounted upon the lower part of the trolley pole and having its lower end engaging a fixed part upon said pole, a shiftable collar mounted upon the pole and engaged by the opposite end of said spring, a pair of tension links connected with the opposite sides of said shiftable member and extending thence to and connected with the lower ends of the corresponding trip levers, a pair of links connecting the upper ends of the respective trip levers with the corresponding yoke arms, each of the latter links having a slot-and-pin lost motion connection at one of its ends, a latch mechanism with which the lower end of each trip lever is normally engaged, and a part or parts moving with the trolley pole arranged to engage and release said latch mechanism when the pole rises to an abnormal angle.

6. In a trolley mechanism, the combination with a turret member, and a pole provided at its lower end with yoke arms pivoted to opposite sides of said turret member so as to oscillate vertically, of a pair of trip levers pivoted between their ends at opposite sides of said turret member to move in planes parallel with the plane of movement of the trolley pole, a main expansion spring mounted upon the lower part of the trolley pole and having its lower end engaging a fixed part upon said pole, a shiftable collar mounted upon the pole and engaged by the opposite end of said spring, a pair of tension links connected with the opposite sides of said shiftable member and extending thence to and connected with the lower ends of the correspond-

ing trip levers, a pair of links connecting the upper ends of the respective trip levers with the corresponding yoke arms, each of the latter links having a slot-and-pin lost motion connection at one of its ends, a latch mechanism with which the lower end of each trip lever is normally engaged, a part or parts moving with the trolley pole arranged to engage and release said latch mechanism when the pole rises to an abnormal angle, and an automatically acting friction clutch mechanism carried by said shiftable member and operating to lock the main spring against expansion when the trolley pole is arrested by the compression of the main spring during its descent after tripping.

7. In a trolley mechanism, the combination with a trolley pole and a suitable support upon which the pole is pivotally mounted, of a main spring and operative connections whereby the main spring exerts its tension to raise the pole towards the vertical and a friction clutch mechanism operative to lock the main spring and control the rise of the pole, comprising a shiftably mounted member, a support upon which said member travels, an eccentric clutch member, a subsidiary shifter adapted to throw said clutch member into or out of operative condition, and a tappet mechanism operating automatically to effect the proper movement of such shifter.

THOMAS H. MARS.

Witnesses:
ALBERT H. GRAVES,
EMILIE ROSE.