

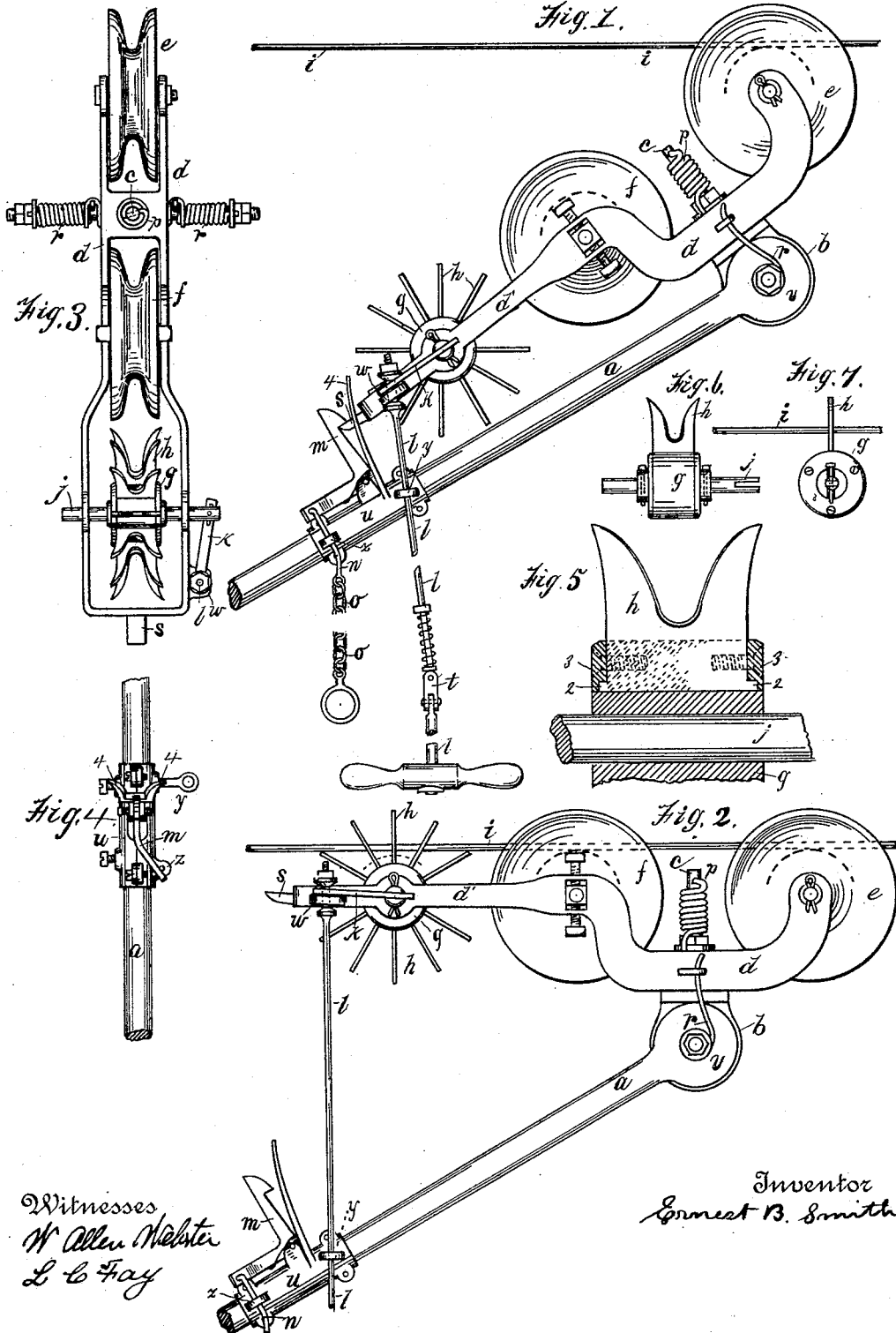
(No Model.)

2 Sheets—Sheet 1.

E. B. SMITH.
TROLLEY WIRE CLEANER.

No. 484,344.

Patented Oct. 11, 1892.



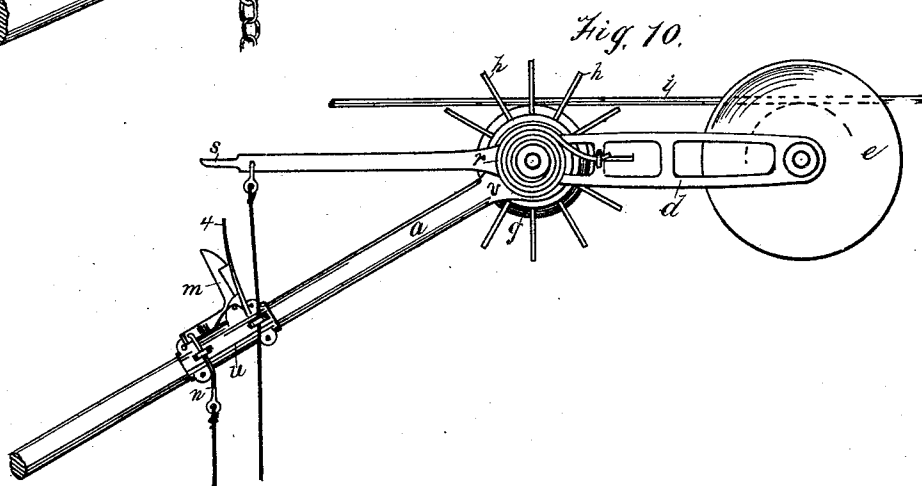
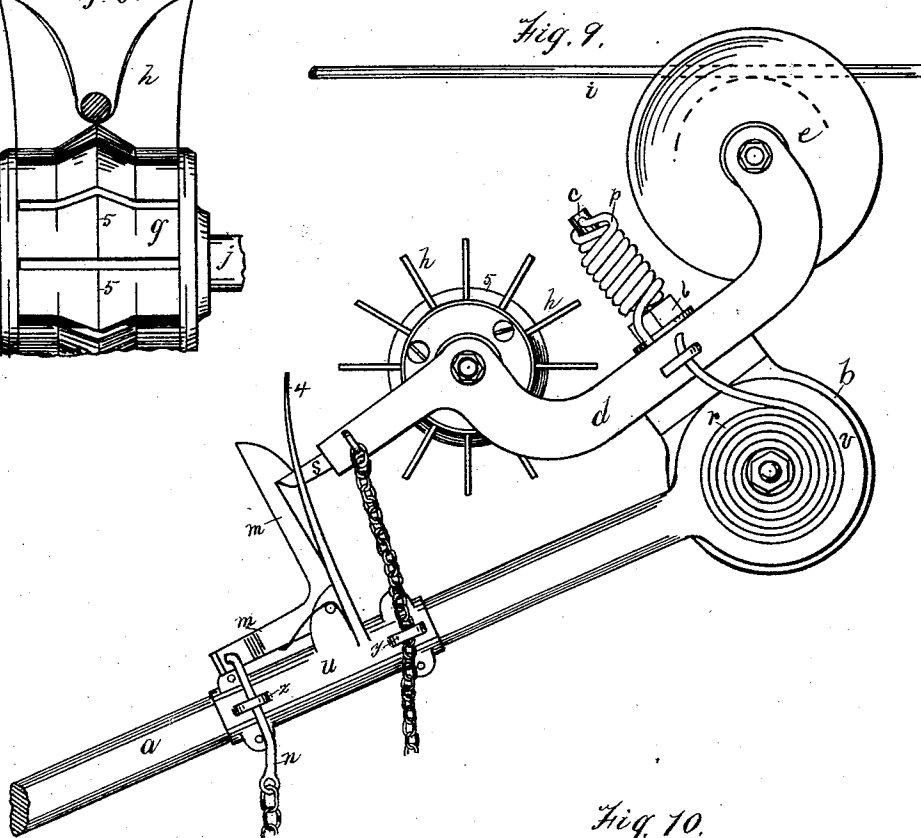
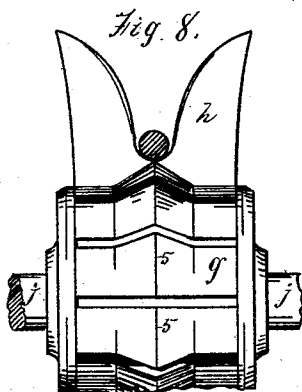
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2 Sheets—Sheet 2.

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Witnesses
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UNITED STATES PATENT OFFICE.

ERNEST B. SMITH, OF SOUTH AMHERST, MASSACHUSETTS.

TROLLEY-WIRE CLEANER.

SPECIFICATION forming part of Letters Patent No. 484,844, dated October 11, 1892.

Application filed February 26, 1892. Serial No. 422,872. (No model.)

To all whom it may concern:

Be it known that I, ERNEST B. SMITH, a citizen of the United States of America, residing at South Amherst, in the county of Hampshire and State of Massachusetts, have invented new and useful Improvements in Devices for Removing Ice from Trolley-Wires, of which the following is a specification, reference being had to the accompanying drawings and letters and figures of reference marked thereon.

In the drawings like letters and figures of reference indicate like parts.

Figure 1 is a side view of the device, illustrating its position when used as an ordinary trolley. Fig. 2 is a side view of the same, illustrating its position when employed for the removal of ice from the wire. Fig. 3 is a plan view of the device. Fig. 4 is a plan view of a section of the trolley-pole with the collar having the latch mechanism attached thereto. Fig. 5 is a sectional view, on an enlarged scale, of the hub of the cleaner or spur-pulley with one of the blades in position. Figs. 6 and 7 are detached views illustrating a simple form of construction for a scraper to be substituted for the spur-pulley. Fig. 8 is a view of a modification in the form of the hub, and Figs. 9 and 10 illustrate modifications in the form of the frame.

In detail, *a* indicates the trolley-pole, *b* a pivotal plate secured thereto, and *c* a stem projecting from the pivotal plate.

d indicates the frame of the device; *e*, the contact-pulley or follower; *f*, the guide-pulley; *g*, the spur-pulley; *h*, the spurs or blades mounted thereon; *i*, the trolley-wire; *j*, the shaft upon which the spur-pulley is mounted; *k*, a lever for operating the same; *l*, a shaft to operate said lever; *m*, a latch to hold the frame in its lowered position; *n*, a rod to operate the same; *o*, a chain or cord connected therewith; *p*, a spring to maintain the frame in a central position upon the pivotal base; *r*, springs to maintain the frame in its elevated position with the spur-wheel in position to clean the wire; *s*, a lug on the end of the frame, with which the latch engages; *t*, a universal joint on the rod *l*; *u*, a collar on the trolley-pole, upon which the latch is mounted, and *v* the enlarged end of the trolley-pole.

The construction will be readily understood

on reference to the drawings, wherein is shown the trolley-pole *a*, having its end V-shaped for convenient attachment of the pivotal base 55 thereto.

The base *b* is provided with a stem *c*, which passes through an opening in the frame adapted to receive it and which is held in position therein by the employment of lock-nuts, as 60 shown, preventing the movement of the frame away from the base, but allowing the frame to rotate upon the base, the stem *c* acting as a pivot.

A spiral spring *p*, attached at one end to 65 the stem *c* and at the opposite end engaging the frame, serves to maintain the frame normally in a position parallel with the trolley-pole, and at the same time allows the frame to turn upon its pivot to facilitate the traverse 70 of the trolley-pulley upon the wire when turning a curve or when passing a switch.

The frame is provided with a guide-pulley *f*, the axle of which is mounted in boxes which are movable in the frame, the office of 75 which pulley is to maintain the free end of the frame in the desired location in reference to the wire.

Mounted within the frame is the spur-pulley *g*, having spurs, arms, wings, or blades secured thereto. The device is arranged, preferably, to bring the base of the opening in the blades close to but not in contact with the wire, thereby preserving the surface of the wire from abrasion or indentation, and at 85 the same time removing the ice which may have adhered thereto. The adjustable guide-pulley *f* enables me to so adjust the device that the position of the clearing spurs or blades with reference to the wire may be al- 90 tered as circumstances direct.

Devices have heretofore been employed to remove ice from trolley-wires, and such devices generally operate to either hammer or pound the wire or to scrape the same, both of 95 which are objectionable, as it is desirable to maintain the trolley-wire in as perfect a condition as possible, and as the wire is generally soft a slight scraping or pounding will roughen its surface, to avoid which, as before 100 stated, my device is so constructed as to operate close to but not in contact with the trolley-wire. The device may, however, be employed as a scraper, if desired, by simply

locking the spur-pulley and preventing rotation of the same, allowing one of the spurs to act as a scraper, or the device may be constructed in substantially the same manner, excepting that one spur-blade may be employed as a scraper and the other blades omitted in the construction. The spur-wheel is mounted upon a shaft *j*, upon which it is free to rotate, and the contact of the spur with the ice upon the trolley-wire will cause the same to revolve, causing the ice to be broken by the passage of the spur-pulley, and the jar occasioned by the device will cause the ice to fall. The frame is made wider in the portion where the spur-pulley is mounted, and this pulley, while revolving freely upon its shaft, is restrained from lateral movement upon the shaft by the employment of suitable collars. The shaft upon which the spur-pulley is mounted is made longer than the distance between the walls of the frame, in order that it may be moved from side to side of the frame to more conveniently follow the curvature of the trolley-wire, and also to enable the same to be shifted to pass frogs and switches.

A lever *k* is pivotally connected at one end to the shaft *j*, and at its opposite end is mounted upon a vertically-arranged rod *l* in such manner that the rotation of the rod in one direction carries the shaft, and with it the spur-pulley, to one side of the frame, and the rotation of the shaft *l* in the opposite direction moves the spur-pulley to the other side of the frame. This rod projects downwardly and is provided with a universal joint *t* and also with a suitable handle, said joint maintaining the handle at all times in convenient position to be grasped by the hand, regardless of the slant or angle at which the rod *l* may stand.

A collar *u* is mounted upon the trolley-pole *a*, and upon the same is pivotally mounted a latch *m*, said latch being shaped in the form of a bell-crank lever and provided with an overhanging lip upon one of its arms to engage the lug *s* upon the end of the frame when the free end of the frame is drawn downwardly, and when it is desired to remove the spur-pulley from its position for operation to clean the trolley-wire the handle upon the rod *l* is drawn downwardly, thus turning the base *b* upon its pivot at the end of trolley-pole and carrying the free end of the frame toward the pole until the lug *s* is engaged by the latch *m*, in which position the latch will hold the free end of the frame until the latch be operated upon by drawing downwardly upon the chain *o*, which operates to turn the latch *m* upon its pivot and allows the springs to carry the frame to its elevated position, as shown in Fig. 2.

The frame is provided with a lug *w*, through which the rod *l* passes, and the opening for the passage of the rod is made tapering in both directions, thus giving the rod free movement as the frame is raised and lowered, cone-

shaped collars being preferably mounted upon the rod at each side of the lug to give the requisite bearing and prevent longitudinal movement of the rod at the opening in the lug. The lower arm of the latch *m* is bent to one side, as shown in Fig. 4, to bring its end in line with the rod *n*, which operates to draw it downwardly when the frame is to be released. The lug *y*, mounted upon the side of the collar *u*, serves as a guide for the rod *l*, and a similar lug *z*, provided with an opening, serves for a guide for the rod *n*. The blades *h* are preferably provided with lugs *2*, which enter recesses in the side plates *3*, and by means of which the blades are maintained in fixed position. The side plates are preferably secured to the central hub by the employment of screws, as shown.

To avoid such tendency as may exist of the turning of the frame upon its pivot when the device is in its lowered position, I provide two guides *4*, which project from the collar *u* upwardly and which are made flaring, as shown in Fig. 4, thus insuring the guiding of the frame to the desired position until the lug *s* is in engagement with the latch *m*.

In Fig. 8 I illustrate a construction of clearing wheel or pulley wherein the hub is provided with a ridge or edge *5*, which bears against the lower portion of the trolley-wire and cuts the ice therefrom.

The opening in the wings for the reception of the trolley-wire is of such depth as to bring the base of the opening flush with the cutting-edge on the hub, thus preventing the resting of the wire against the edge for any considerable distance, and this edge, being blunt, will support the wire and prevent the wings pounding and marring the wire, and the walls of the recess in the wings are separated a sufficient distance at the base of the opening to prevent contact of the side walls of the recess with the wire, but are sufficiently close to the wire to insure the breaking of ice therefrom.

In Fig. 9 I illustrate a modification in the construction of the frame wherein the guide-pulley *f* (shown in Figs. 1, 2, and 3) is omitted, enabling me to construct the frame of less length than as in the first instance, and in this construction, also, I illustrate the application of a different form of spring employed for the purpose of turning the base *b* upon its pivotal support to a position to carry the frame to its elevated position, the spring in this instance being a flat coil instead of a tubular coil, as shown in Fig. 3.

In Fig. 10 I illustrate another modification in the construction of the frame and its connection with the trolley-pole, wherein the pivotal connection is made upon the same shaft or at the same location in which the clearing-pulley has bearing. In this case I preferably employ a straight frame, the remainder of the construction and operation being substantially the same as before described.

Having therefore described my invention,

what I claim, and desire to secure by Letters Patent, is—

1. The combination of a trolley-pole with a frame pivotally attached thereto, a contact-pulley mounted in said frame, and a clearing device mounted in the same frame, substantially as and for the purposes stated.

2. The combination of a trolley-pole *a*, a base *b*, pivoted thereto, and a frame, as *d*, pivotally mounted upon the base *b*, and a guide-pulley and clearing device mounted in said frame, substantially as and for the purposes stated.

3. The combination, with a trolley-pole, of a frame pivotally mounted thereon, a trolley-wheel mounted therein, an adjustable guide-pulley, and a clearing device, all mounted in said frame, substantially as and for the purposes stated.

4. The combination of a trolley-pole *a*, provided at its upper end with a plate *v*, a base *b*, arranged with its face against the face of the plate *v*, a pivot extending horizontally through said base and plate, a frame *d*, mounted upon said base, and a spring mounted upon said plate and arranged with its end to engage the frame and turn the base upon its pivot to carry the frame normally toward the wire, substantially as and for the purposes stated.

5. The combination of a trolley-pole *a*, provided with a wide ear, a frame provided with a like ear pivoted thereto, and one or more springs *r* to normally maintain the frame in its elevated position, substantially as and for the purposes stated.

6. The combination of a trolley-pole having a frame pivotally mounted thereon, a latch, as *m*, mounted adjacent to the pole, and means to cause the frame to turn upon its pivot to engage the latch, substantially as and for the purposes stated.

7. The combination of a trolley-pole, a frame pivotally mounted thereon, a collar mounted upon the trolley-pole, a latch *m*, mounted upon the collar, means, as a spring, to cause the frame to turn upon its pivot and engage the latch, and means to release the latch and allow the frame to return to its elevated position, substantially as and for the purposes stated.

8. The combination of a trolley-pole, a frame mounted thereon, a clearing device mounted

in said frame upon a shaft, having movement from side to side of said frame, a lever *k*, pivotally mounted upon said frame and arranged to engage the shaft, and means to move said lever to carry the clearer from side to side, substantially as and for the purposes stated.

9. The combination, with a trolley-pole, of a frame, a clearing device mounted in said frame upon a shaft *j*, said shaft being free to be moved to carry the clearing device from side to side of said frame, a lever *k*, pivotally connected to said shaft, and a rod *l*, having one end secured to the lever *k* and its opposite end projecting to a position convenient to be grasped from the car, substantially as and for the purposes stated.

10. The combination of a trolley-pole, a frame pivotally mounted thereon turning upon its pivot in a vertical plane, means to turn said frame upon said pivot, a catch to hold the same in its lowered and elevated position, and guide 4, mounted upon said pole to guide the free end of the frame to a position to be engaged by the catch, substantially as and for the purposes stated.

11. The combination of a trolley-pole *a*, the base *b*, pivotally mounted at the end thereof, springs *r*, arranged to normally maintain the base in one position, a frame *d*, pivotally mounted upon said base, a spring *p*, arranged to normally maintain the frame in line with the trolley-pole, a trolley-wheel *e*, a guide-wheel *f*, a clearing device, means to lower the frame, and means to hold the same in its lowered position, substantially as and for the purposes stated.

12. The combination of a trolley-pole, a frame pivotally mounted between its ends upon the pole, a contact-pulley mounted in said frame, and a clearing device mounted in the frame adjacent to the pole end, substantially as shown.

13. The combination, with a trolley-pole, of a suitable frame and a clearing device consisting of a hub having a central ridge 5 and a series of wings provided with openings, substantially as shown.

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