Sept. 30, 1924.

1,510,015

C. L. RAYFIELD

CLEANING MECHANISM

Filed Nov. 25, 1921

2 Sheets-Sheet 1

FIG. 1

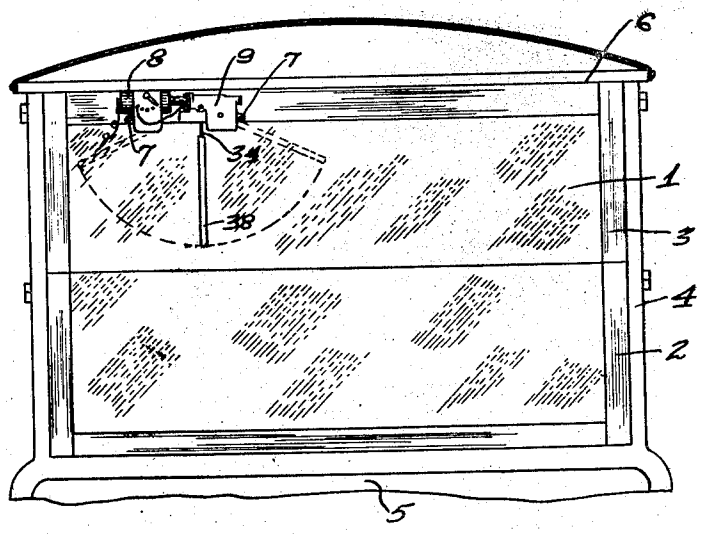


FIG. 8

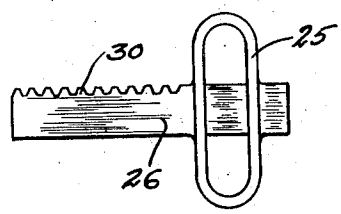


FIG. 6

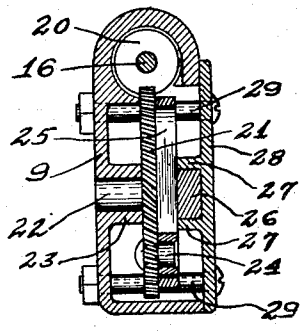
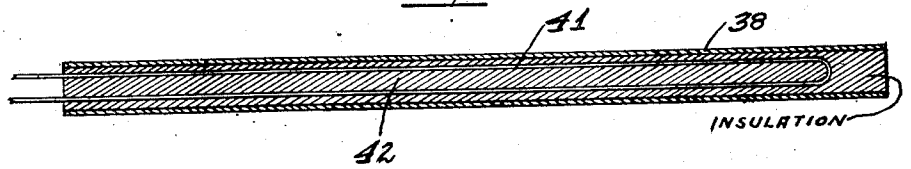


FIG.



Witnesses

Rudolph J. Berg.

Charles W. Fiel Jr.

Inventor

CHARLES L. RAYFIELD.

By Charles W. Fiel Atty.

Sept. 30, 1924. 1,510,015

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CLEANING MECHANISM

Filed Nov. 25, 1921 2 Sheets-Sheet 2

Fig. 2

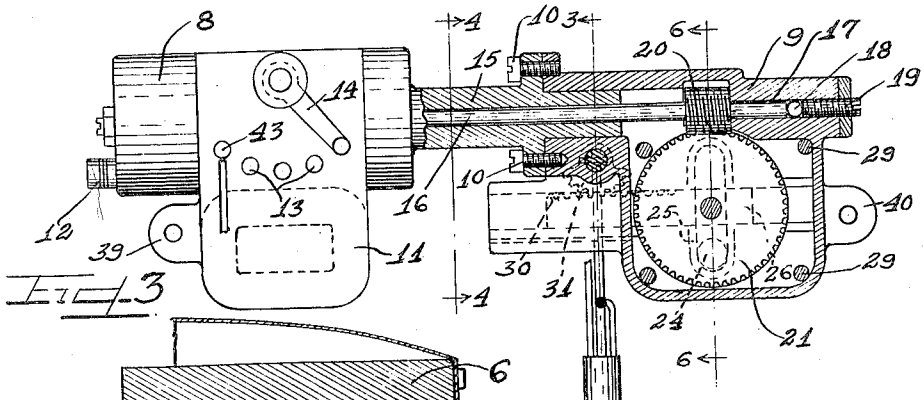


Fig. 3

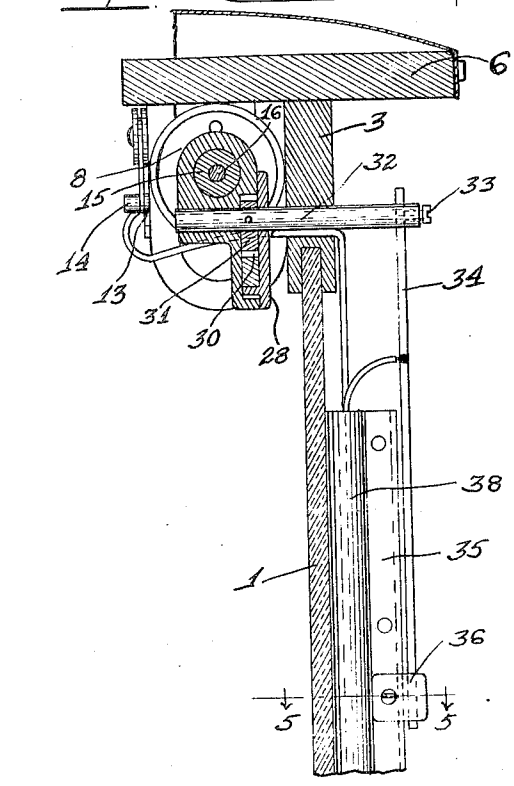


Fig. 5

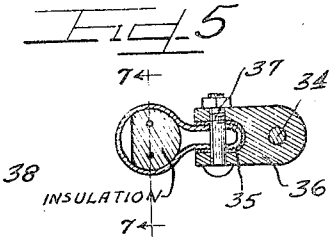
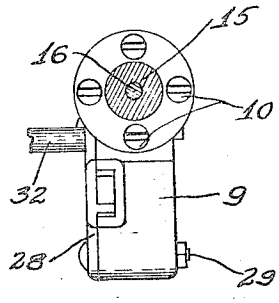


Fig. 4



Witnesses

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Charles L. Rayfield

By Charles W. Hills Atty.

Patented Sept. 30, 1924. 1,510,015

UNITED STATES PATENT OFFICE.

CHARLES L. RAYFIELD, OF CHICAGO, ILLINOIS.

CLEANING MECHANISM.

Application filed November 25, 1921. Serial No. 517,431.

To all whom it may concern:

Be it known that I, CHARLES L. RAYFIELD, a citizen of the United States, and a resident of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in a Cleaning Mechanism; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings and to the numerals of reference marked thereon, which form a part of this specification.

This invention relates to a power operated cleaning mechanism and particularly to an electrically driven mechanism which is designed to automatically clean the deposists of rain, snow, sleet and the like from transparent shields to afford a clear view therethrough. Devices of this kind are particularly desirable for use in connection with automotive vehicles and with other power propelled craft where the attention of the operator is so occupied that manual removal of the interfering deposits from the windshield is impracticable. It is also especially desirable that such devices be positive in operation and effective under all operating conditions.

It is an object of the present invention to provide a power driven cleaning mechanism of the class described wherein the cleaning member moves rapidly across the field of vision and at a slower rate at the boundaries thereof.

It is a further object of this invention to provide a power operated cleaning mechanism which is provided with means for heating the cleaning member.

It is another object of this invention to provide a power operated cleaning mechanism of the class described having means for regulating the rate of movement of the cleaning member.

It is also an object of this invention to provide a mechanism of the class described which is provided with an improved cleaning member.

It is an important object of this invention to provide an electrically operated mechanism for cleaning rain, snow, sleet and the like from transparent protective shields.

Other and further important objects of this invention will be apparent from the disclosures in the specification and the accompanying drawings.

The invention (in a preferred form) is shown on the drawings and hereinafter more fully described.

On the drawings:

Figure 1 is a rear elevation of a wind shield with parts in section and showing the improved cleaning mechanism of this invention mounted thereon.

Figure 2 is an enlarged rear elevation of the cleaning mechanism with parts in section.

Figure 3 is an enlarged fragmentary section on the line 3—3 of Figure 2 with parts in elevation.

Figure 4 is a fragmentary section on the line 4—4 of Figure 2.

Figure 5 is a slightly enlarged section on the line 5—5 of Figure 3.

Figure 6 is a section on the line 6—6 of Figure 2, with parts in elevation.

Figure 7 is a section on the line 7—7 of Figure 5.

Figure 8 is an enlarged detail elevation of a part of the operating mechanism.

As shown on the drawings:

The cleaning mechanism of this invention is particularly adapted to be used for cleaning rain, snow and the like from vehicle windshields and in the accompanying drawings is shown mounted on such a windshield for this purpose. Said windshield, which is represented by the reference numeral 1, ordinarily comprises transparent members which are mounted in hinged frames 2 and 3 which in turn are mounted on a supporting structure 4 which extends from a vehicle dash 5 to the vehicle top 6. Secured to the inner side of the transverse upper portion of the frame 3 by means of screws or bolts 7 is a power operating means for the cleaning mechanism which comprises a casing 8 to which a transmission casing 9 is secured by means of machine screws 10 which are engaged through registering

threaded apertures formed in oppositely disposed flanges on said casings. The casing 8 affords a support for a small electric motor 11 which is supplied with electrical energy through a suitable terminal 12 and which is provided with an ordinary rheostat 13 mounted on the rear side of the casing 8 and provided with a controller handle 14, which may be moved to various points of the rheostat to regulate the speed of the motor. An extension 15 on the motor casing 8 extends into a recess in the casing 9 and axially mounted in said extension 15 is a rotatable shaft 16 which is connected to and extends outwardly from the motor armature. The outer end of said shaft 16 is journalled in a bearing formed at 17 in the casing 9, the thrust of the end of said shaft being taken up by a ball bearing 18 which is adjustably secured in position in the bearing 17 by an adjustable set screw 19. Mounted on said shaft 16 inside the casing 9 at the inner end of the bearing 17 is a worm 20 which meshes with a worm gear 21 which is rotatably mounted inside the casing 9 on a stub shaft 22 pivoted in a boss 23 on the inside of the casing. Eccentrically mounted on one face of said worm gear 21 is a roller 24 which is engaged in a slotted guide 25 formed on a bar 26 which is slidable in a track-way 27, integrally formed on the inner face of a plate 28 which is secured to the casing 9 by means of bolts 29 engaged through said plate and said casing.

From this construction it is of course apparent that the rotation of the worm gear 21 will cause a reciprocation on the bar 26 and a rack 30 formed on the outer end of said bar meshes with a pinion 31 which is secured to a shaft 32 extending through the frame 3 to the front of the windshield and having its inner end journalled in the casing 9. Adjustably secured in the outer end of said shaft 32 by means of a set screw 33 engaged therein is a spring wire rod or shaft 34 which extends downwardly along the front of the windshield and which acts to support a longitudinal frame 35 in which the cleaning member is mounted. The connection between said longitudinal frame 35 and the spring wire member 34 is afforded by a bracket 36 which is engaged over the lower end of said spring wire and which is pivotally connected to the frame 35 at a point intermediate its ends by means of a bolt 37 which is engaged through said bracket 36 and through said frame member. Secured in said frame member 35 by means of rivets or in any other suitable manner is a hollow soft rubber wiper or cleaner member 38 which is adapted to be moved over the outer surface of the windshield by the oscillation of the shaft 32 and the spring wire member 34 to remove rain, snow, sleet and other foreign matter from said outer surface. On account of the flexibility of said member 38, the same will readily conform to any irregularities in the surface of the transparent windshield 1. Adjustment for various angular positions of the windshield 1 is of course provided by the pivoting of the frame 35 about the bolt 37. Apertured lugs 39 and 40, which are formed on the casings 8 and 9 respectively, are engaged by the bolts 7 and afford means whereby the mechanism is supported on the windshield frame.

In order to facilitate the removal of frozen snow or sleet from the windshield, means are provided for heating the member 38 when desired and said means in the present instance comprise a resistance wire or heating element 41 which is mounted inside the member 38 in an insulating member 42 and which has one terminal grounded on the rod 34 and the other terminal extending through the windshield frame 3 and connected with a point 43 on the rheostat 13, said point 43 also being connected to one of the contacts on said rheostat so that the handle 14 may be moved into position to connect the motor 11 for operation and at the same time to connect said heating element 42 in the circuit.

The operation is as follows:

The mechanism is installed on the windshield frame by means of the bolts 7 which are engaged through the lugs 39 and 40, the shaft 32 at the same time being extended through an aperture drilled in a windshield frame for this purpose. An aperture for the terminal and of the heating element 42 is also provided adjacent the aperture through which said shaft 32 extends in order that said terminal may be led back to the rheostat 13. After the mechanism is secured in position on the rear of the windshield frame a cleaning member is secured to the end of the shaft 34 by means of the set screw 33 and the mechanism is ready for operation. The motor 11 is started by moving the controller handle 14 on the rheostat to one of the contact points on the rheostat and the rotation of the motor armature is of course transmitted through the shaft 16 to the worm 20 which meshes with the worm gear 21 and causes the same to rotate. The rotation of the worm gear 21 is of course transmitted through the roller 24 and the guideway 25 to cause a reciprocation of the bar 26 and the rack 30, this movement of the rack 30 in turn being transmitted through the pinions 31 and the shaft 32 to sweep the cleaning member 38 back and forth across the face of the windshield in the path indicated in dotted lines in Figure 1. This sweeping movement of the

cleaning member 38 of course affords a clear field of vision through the windshield by keeping all foreign matter clean from the front surface thereof, and since this cleaning is done automatically it is possible for the driver of the vehicle or craft to see through the windshield at all times.

On account of the eccentric action of the roller 24 in the guideway 25 and the engagement of the rack 30 with the pinion 31, the cleaning member is moved across the center of the field which is cleaned at a greater rate of speed than it is at the end of its travel just prior to and just after the reversal of the direction of said travel. This is a desirable feature since the cleaning member is thereby moved quickly out of the range of the operator's vision and is retained out of such range of vision for a relatively long time.

The provision of the heating element in the cleaning member makes the same adaptable for the removal of frozen deposits on the windshield and greatly enlarges the field of usefulness of the mechanism. The provision of the rheostat 13 makes possible the operation of the mechanism at varying rates of speed and therefore adapts the same for varying conditions.

It will accordingly be observed that this invention provides an automatic windshield cleaning mechanism which may be easily installed and which acts to automatically remove foreign deposits which interfere with the operator's vision with a minimum of attention on the part of the operator.

The casing 9 may be filled with suitable lubricant when the device is assembled and very little attention to the lubrication of the worm drive is subsequently required.

In view of the fact that practically all vehicles and craft on which the mechanism might be employed are equipped with sources of electrical energy, it is only necessary to provide connections from such source to the motor 11 to afford the necessary power means to operate the device. The mechanism may be economically manufactured and it will be observed that there are few parts which are liable to become worn or get out of order and that all of the parts are convenienetly accessible for replacement, adjustment or repair.

I am aware that numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I therefore do not purpose limiting the patent granted otherwise than necessitated by the prior art.

I claim as my invention:

1. A windshield cleaner comprising a wiper mounted for reciprocation over a windshield glass, and means for reciprocating said wiper, said wiper comprising an elastic tubular member having a heating element therein.

2. A windshield cleaner comprising a wiper adapted for reciprocation over a windshield glass, and means for reciprocating said wiper, said wiper comprising a soft rubber tube and means within said tube for heating the same.

3. A windshield cleaner comprising a wiper adapted for reciprocation over a windshield glass, and means for reciprocating said wiper, said wiper comprising a soft rubber tube and an electrical resistance element embedded in an insulating member within said tube.

4. In a windshield cleaner, a casing, a shaft journaled therein, means within the casing for rocking the shaft, and a wiper mounted on said shaft comprising a hollow soft rubber element containing means for generating heat therein.

5. In a windshield cleaner, a casing, a shaft journaled therein, means within the casing for rocking the shaft, and a wiper mounted on said shaft comprising a flexible tubular member, and a heating element contained in said member.

6. In a windshield wiper, a soft rubber tube, an electrical heating element therein embedded in an insulating member within said tube and mechanism adapted to move said tube over a windshield glass.

7. A windshield cleaner comprising a soft rubber tube, an electrical resistance element therein surrounded by insulating material and means for traversing said tube over a windshield glass.

In testimony whereof I have hereunto subscribed my name in the presence of two subscribing witnesses.

CHARLES L. RAYFIELD.

Witnesses:
CARLTON HILL,
JAMES M. O'BRIEN.