Feb. 27, 1934.

J. DUNLOP

1,948,747

ELEVATOR GUIDE RAIL LUBRICATOR

Filed May 6, 1931

4 Sheets-Sheet 1

Fig.1.

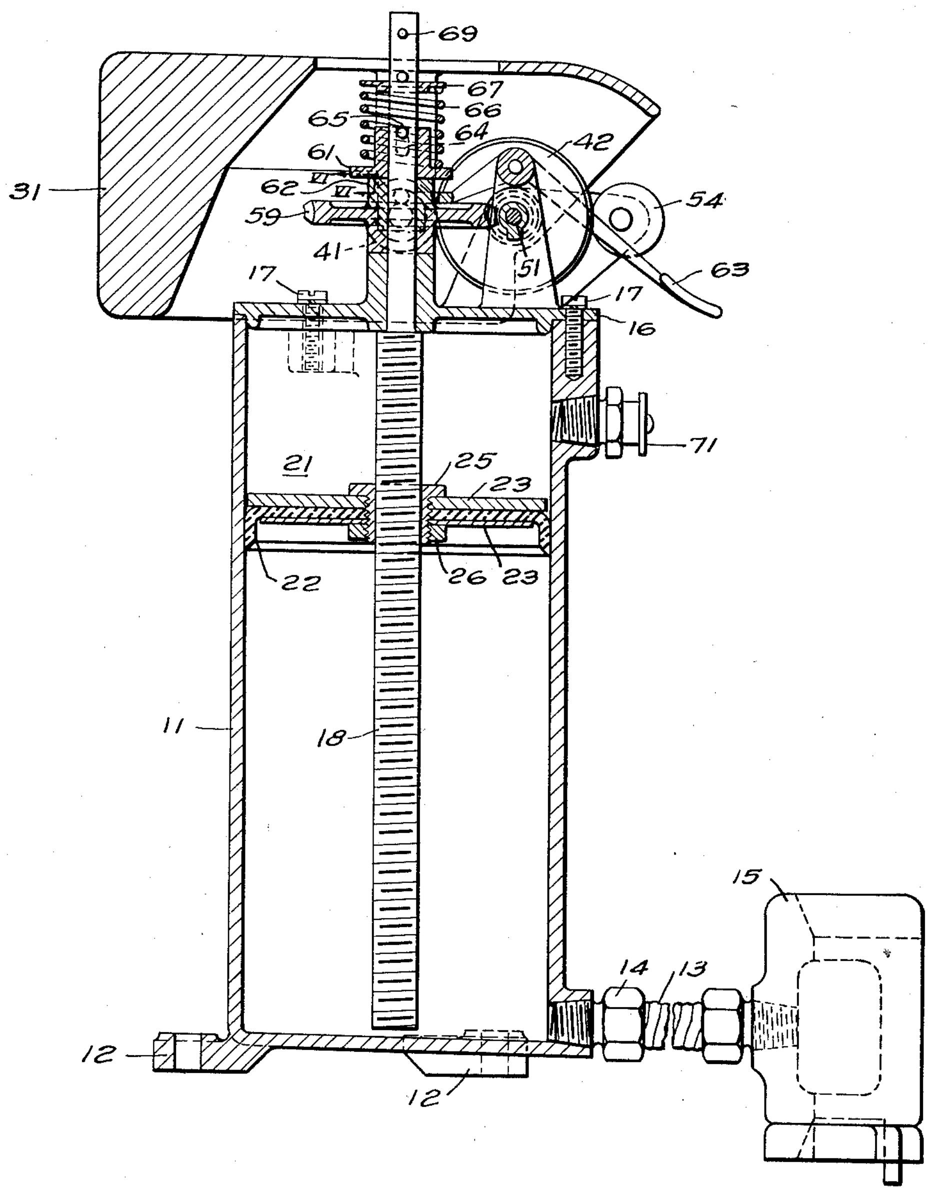

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Fig. 2.

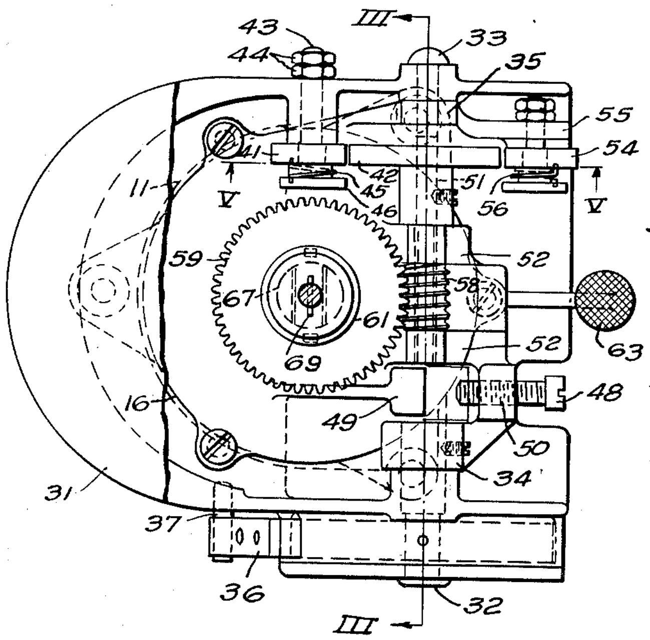

Fig. 3.

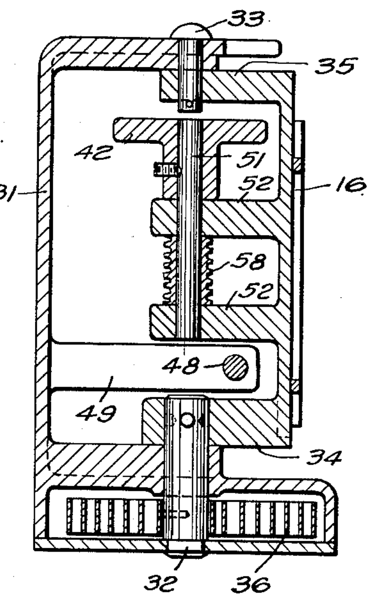

Fig. 4.

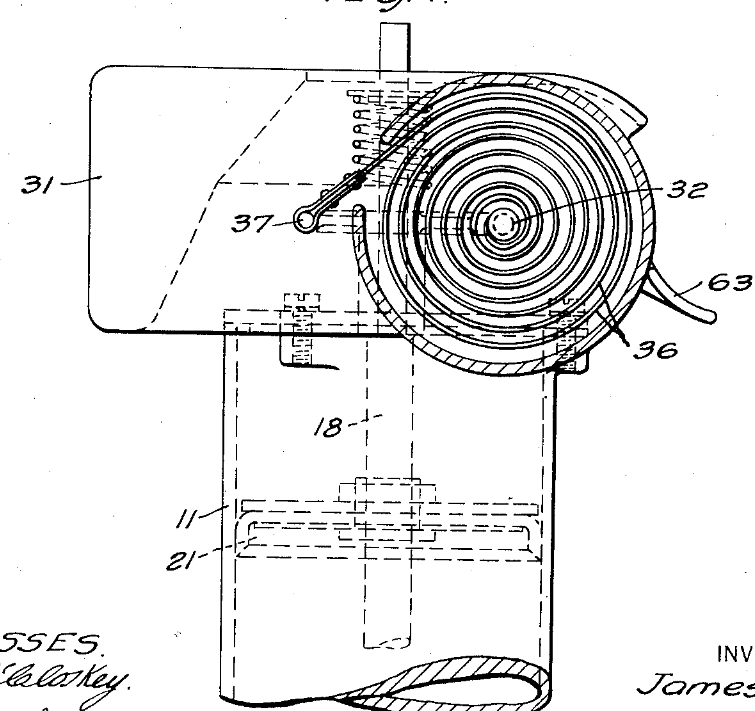

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Fig. 5.

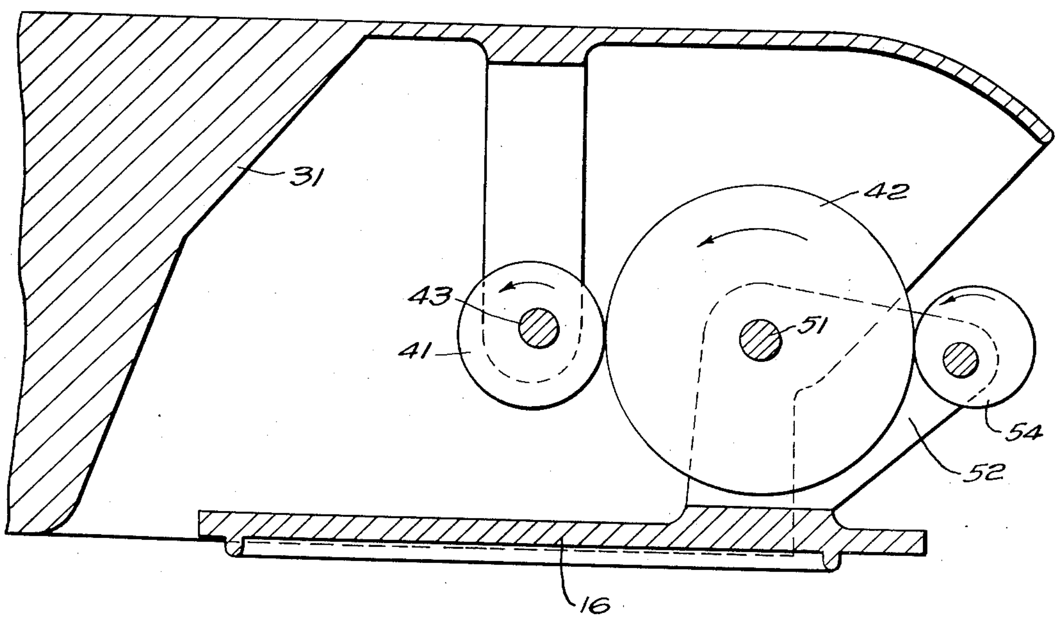

Fig. 6.

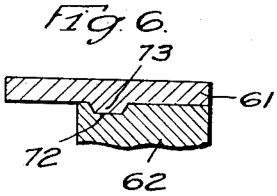

Fig. 7.

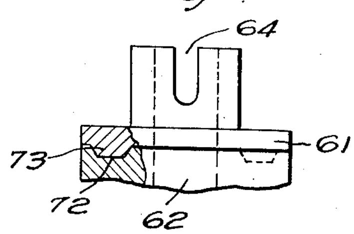

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Fig. 8.

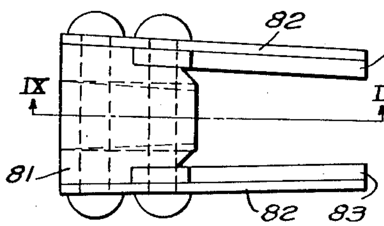


Fig. 9.

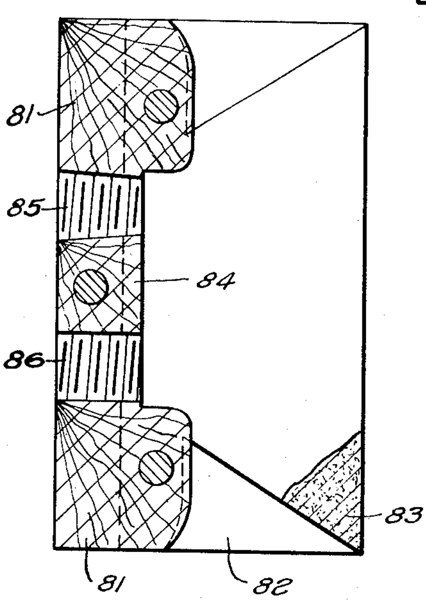


Fig. 10.

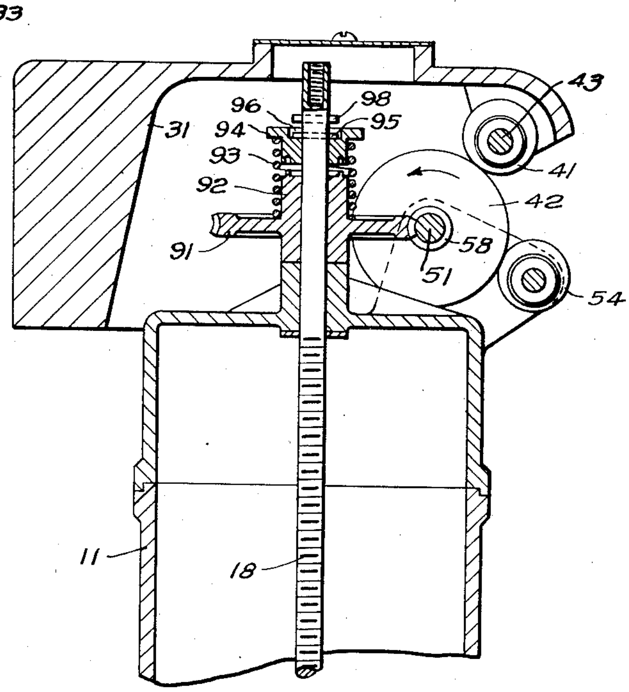
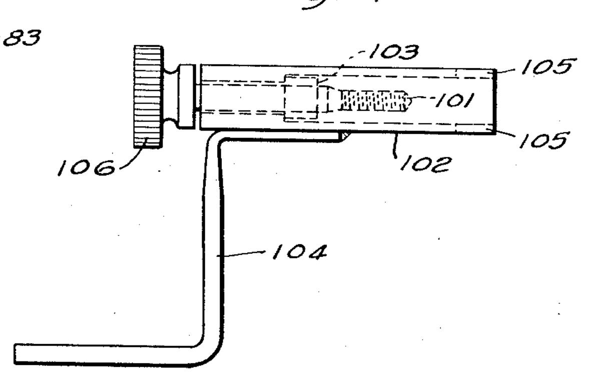


Fig. 11.



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UNITED STATES PATENT OFFICE

1,948,747

ELEVATOR-GUIDE-RAIL LUBRICATOR

James Dunlop, Park Ridge, Ill., assignor to Westinghouse Electric Elevator Company, a corporation of Illinois

Application May 6, 1931. Serial No. 535,479

3 Claims. (Cl. 184—37)

My invention relates to lubricators and more specifically to elevator-guide-rail lubricators to be carried by the car and actuated by the motion of the car as it travels up and down the hatchway.

It is customary practice to guide the movements of elevator cars by means of guide rails secured in the hatchway in cooperative relation to guide shoes on the car. The proper lubrication of such guide rails and shoes is essential in order to minimize noise and wear and it is necessary that a mechanic inspect the rails and apply grease thereto regularly. In order to properly apply the grease to the rails a mechanic rides on the top of the car which must make a special trip for this purpose, thereby causing considerable trouble and expense.

Further, so great is the trouble of greasing the guide rails in this manner that the mechanics are inclined to wastefully apply a large quantity of grease to the rails at one time and to thereafter neglect them for a long period. The unusually large quantity of grease which drops from the rails is not only wasted but, remaining in the hatchway, constitutes a fire hazard.

It is, accordingly, an object of my invention to provide a lubricator which may be carried by the car to automatically lubricate the rails and guide shoes as the car travels up and down the hatchway.

It is also an object of my invention to provide an elevator lubricator which will automatically lubricate the guide rails and shoes in response to movements of the car.

A further object of my invention is to provide a reliable elevator-guide-rail lubricator of compact design which may be conveniently mounted on the elevator car and which will be automatic and independent in its operation.

The invention itself, however, both as to its organization and its method of operation, together with additional objects and advantages thereof, will best be understood from the following description of a specific embodiment, when read in conjunction with the accompanying drawings in which:

Figure 1 is a sectional view taken vertically through the center of the device constituting my invention;

Fig. 2 is a plan view of the structure shown in Fig. 1 with parts broken away;

Fig. 3 is a sectional view taken along line III—III of Fig. 2;

Fig. 4 is a view, in side elevation, of the upper portion of the device, the spiral-spring cover being removed;

Fig. 5 is an enlarged view on line V—V of Fig. 2 showing the eccentric cams in cooperative relation with the drive wheel;

Fig. 6 is an enlarged sectional view taken on line VI—VI of Fig. 1;

Fig. 7 is a detail view showing the cooperating elements of the clutch employed;

Fig. 8 is a plan view of a grease distributor for use with my lubricator;

Fig. 9 is a sectional view taken on line IX—IX of Fig. 8;

Fig. 10 is a sectional view of a modified form of my lubricator device; and

Fig. 11 is a view, in side elevation, of a recharging key for use therewith.

Referring more specifically to Fig. 1 of the drawings, the device comprises a cylinder or lubricant retainer casing 11 provided with lugs or feet 12 for mounting the device on an elevator car. An armored hose 13 is connected to the bottom of the cylinder 11 by means of a fitting assembly 14 and extends into the adjacent elevator guide shoe 15, where it is secured by a similar fitting.

The cylinder 11 is closed by a closure plate 16 which is secured thereto by suitable screws 17. Journalled in the center of the closure plate 16 and depending into the cylinder, is a piston feed shaft 18 which carries a piston or lubricant compressor 21 into the cylinder 11 to thereby force the lubricant to the guide shoe 15 and the associated guide rail (not shown). The piston 21 consists of a large flexible disc 22 of leather or any other suitable material clamped between a pair of large washers 23 which are compressed by a hollow bushing 25 and a nut 26. The bushing 25 is provided with a threaded orifice extending axially therethrough to receive the piston feed shaft 18 which is threaded throughout its entire length.

By the rotation of the threaded feed shaft 18, which is rotatably journalled in the closure plate 16, the piston 21 is forced into the cylinder 11, and the lubricant is expelled therefrom. The actuating mechanism for driving the feed shaft 18 is assembled on the top of the closure plate 16 and comprises a pivoted inertia weight 31 and actuating mechanism associated therewith.

The inertia weight 31 constitutes a cover and is pivotally mounted above the actuating mechanism on pivot pins 32 and 33 supported by standards 34 and 35 on the closure plate 16, as more clearly shown in Figs. 2 and 3. The pivot pin 32 serves also as a fixed anchor for one end of a spiral biasing spring 36, the other end of which is anchored to a pin 37 extending from the inertia weight 31. The spring 36 reacts between the fixed pivot pin 32 and the anchor pin 37 on the weight 31 to normally bias the weight upwardly. Whenever the car starts upwardly or stops when travelling down, the inertia of the pivoted weight 31 causes it to oscillate downwardly, the spring 36 thereafter returning it to its normal position when the car comes to rest or assumes a constant velocity. A stop screw 48 is supported in engaging relation to a lug 49 depending from the weight by a standard 50 rising from the cover plate 16. By adjusting the stop screw 48 the normal position of the pivoted weight 31 is predetermined.

In order that the oscillations of the weight 31, caused by the starting and stopping of the car may be effective to drive the feed shaft 18, a drive wheel 42 is provided on a shaft 51 which is in axial alignment with the pivot pins 32 and 33 which support the inertia weight 31, as shown in Figs. 2 and 3. An eccentric cam 41 is mounted on the inertia weight 31 in cooperating relation to the drive wheel 42, as shown in Fig. 5.

The cam is eccentrically mounted on a bearing bolt 43 extending through the side of the weight and secured in place by a pair of lock nuts 44. An enlarged portion of the bolt 43 is secured in abutting relation to the inner side of the weight and provides a bearing surface for the cam 41. The inner end of the bolt 43 provides a spring barrel for a spiral torque spring 45 one end of which is anchored in the side of the cam eccentric 41 and the other end of which is anchored in the bolt head 46. The torque spring 45 reacts between the head of the bolt and the cam to hold the latter in place, and to apply a biasing torque which tends to rotate the cam counterclockwise and urge it continuously into engaging relation to the periphery of the drive wheel. The drive-wheel shaft 51 is supported by standards 52 which rise from the closure plate 16 and are stationary.

It will be apparent that, when the pivoted inertia weight 31 oscillates and carries the eccentric cam 41 downwardly, the latter, because of its eccentricity, binds on the periphery of the drive wheel 42 and causes it to rotate immediately without lost motion, such as occurs with a pawl-and-ratchet device. The direction of rotation of the drive wheel is as indicated by the arrow in Fig. 5. However, when the cam 41 moves upwardly, in returning to its normal position because of its eccentricity, it will turn away from the drive wheel 42 and will slide freely over it.

To prevent reverse rotation of the drive wheel, a brake cam eccentric 54 is mounted in cooperative relation thereto. The brake cam 54 is eccentrically mounted on a bolt supported by a stationary standard 55 rising from the closure plate 16 and is provided with a biasing torque spring 56 tending to rotate it in a counter-clockwise direction similar to the ratchet cam. Any tendency of the drive wheel 42 to rotate backwardly will cause the brake cam 54 to bind and lock immediately to prevent lost motion. The brake cam and the drive wheel do not move except to rotate, because they are mounted on a stationary part of the device. The driving cam 41, however, moves up and down because it is mounted on the pivoted weight 31 which oscillates when the car starts and stops. To accentuate the binding effect of the cams 41 and 54 on the driving wheel 42, either or all may be provided with hardened knurled surfaces.

The shaft 51, which supports the drive wheel 42, also supports a worm 58 which it drives in cooperative engagement with a worm wheel 59 associated with the feed shaft 18. Each time the inertia weight 31 oscillates, its drive cam 41 binds on the drive wheel 42 and turns it forward a small angular distance. The rotation of the drive wheel 42 is transmitted to the worm 58 through the drive shaft 51. The worm 58, in turn, drives the worm wheel 59 but its rotation is at a much slower rate. The worm wheel 59 drives the threaded feed shaft 18 very slowly and depresses the piston 21 to expel the lubricant from the cylinder 11 with sufficient pressure to move the heavier grades of lubricant.

In order to provide for convenience in recharging the grease container, the worm wheel 59 is connected to the feed shaft 18 through a clutch 61, 62 (see Fig. 1) which may be disengaged by depressing a lever 63. The structure of the clutch, as shown in Figs. 1, 6 and 7, comprises a slidable male clutch member 61 concentrically disposed on the upper end of the feed shaft 18 and provided with a slot 64 for engaging a pin 65 to drive the shaft 18. As shown in Figs. 1 and 7, the slot 64 is sufficiently elongated to permit considerable movement of the slidable clutch member 61.

A female clutch member 62 is secured to, or is integral with, the worm wheel 59 and is provided with depressions 72 which receive projections 73 extending from the slidable member.

The relatively movable portions of the clutch are normally held in engaging relation by a compression spring 66 which reacts between a washer 67, secured to the upper end of the feed shaft 18, and the slidable clutch member 61 which is thereby depressed into engagement with the female portion associated with worm wheel 59. The rotation of the worm wheel 59 is normally transmitted to the feed shaft 18 through the clutch members 61 and 62 and the pin 65.

The clutch-release lever 63 is provided with a fork extending into engaging relation with the lower side of the slidable clutch member 61. By depressing the outer end of the clutch-release lever 63 the slidable male clutch member is lifted away from the female portion, and the feed shaft 18 is then disconnected from the worm wheel 59, It is then possible, by placing a key on the upper end of the feed shaft 18 in engaging relation with the pin 69, to manually turn the feed shaft and raise the piston. When the piston is elevated to the top of the grease retainer, a grease gun may be connected to the fixture 71, and the cylinder 11 be refilled.

In operation, the piston is depressed very slowly through the speed-reducing gear associated therewith and it is necessary only to replenish the supply of lubricant at long intervals of time, every six months, for example, under normal conditions. One lubricator device will be provided for each guide rail. Although both guide rails may be lubricated from one lubricator by using branch pipes, it is not advisable to arrange them in this manner, as there is always the possibility of one pipe line becoming stopped and all the grease being applied to one rail.

Instead of feeding the grease directly into the guide shoes, it is desirable to provide a grease distributor which, as shown in Figs. 8 and 9, is especially designed to receive the grease and distribute it over the guide rail. This device comprises a base or body member 81, which may be made of wood or a phenolic condensation product, and side plates 82 which are bolted or otherwise secured thereto in any suitable manner. The body or base member is slightly tapered so that the outer edges of the side plates 82 are inclined toward each other, and is of such thickness that the stem of the T-guide rail (not shown) may be received between the plates. Secured between the side plates 82 and the base member 81 are pieces of leather or linoleum 83 of substantially trapezoidal shape disposed with the long bases adjacent to the outer edges of the side plates and with the upper and lower edges cut at an angle to the base. The base member 81 presents a pocket or cavity 84 for receiving the grease from the lubricator. A threaded orifice 85 is provided in the back of the base member to receive the grease conduit from the lubricator. A second threaded orifice 86 is provided in the back of the base member for receiving a bolt or screw to secure the device to any suitable bracket on the car (not shown).

As the car travels up and down the hatchway, the grease-distributing device applies grease to the stem of the T-guide rail and spreads it in a manner that is most effective. The pieces of leather or linoleum which are carried adjacent to the stem of the guide rail, are of such shape that they are effective to wipe the grease toward the distributing device rather than to push it back toward the flange of the rail. The distributing device thereby serves to continuously apply the grease to that portion of the rail which cooperates with the elevator guide shoes and it also serves to draw forward any grease which may have worked back toward the flange of the guide rail. Such a distributor used in conjunction with my pressure feed lubricator is well adapted to apply the heavy grades of lubricant.

I have also provided a second embodiment of the lubricating device wherein, as shown in Fig. 10, the clutch-releasing lever 63 has been omitted and the clutch has been so constructed that it is automatically released when a key is applied for turning the threaded shaft 18 to elevate the piston. In this embodiment of my invention, the worm wheel 91 for driving the threaded shaft 18 is of such formation that it presents an upwardly projecting hub 92. A spiral biasing spring 93 is disposed in concentric relation on the hub and its upper end engages an annular clutch ring 94. The biasing spring normally holds the clutch ring 94 in cooperative relation to a pin 95 which extends through the upper end of the shaft 18 and projects from both sides. The upper surface of the annular clutch ring 94 is provided with diametrically opposed notches 96 for receiving the projecting ends of a pin 95 which extends through the shaft 18. In normal operation, the spring 93 urges the clutch ring 94 upwardly into engaging relation to the pin 95 and the driving torque is transmitted from the worm wheel 91 and its hub 92 through slidably interengaging teeth which extend axially, then to the clutch ring 94, and through the pin 95 to the shaft 18.

In Fig. 11 I have shown the key which may be employed to release the clutch and elevate the piston when it is desired to recharge the device with grease. The key comprises a threaded screw 101 which is secured in spaced rotatable relation within a tubular piece 102 by a bushing 103. A crank member 104 extends laterally from the side of the tubular piece 102, to which it is secured in any suitable manner, as by welding. The open end of the tubular piece 102 is provided with slots 105 which are adapted to pass over the ends of a pin 98 projecting through the upper end of the shaft 18.

The threaded end of screw 101 is adapted to enter the upper threaded end of the shaft 18. It is provided with a knurled head 106 to facilitate turning it within the tubular piece 102 as it is screwed into the shaft 18. As the screw 101 enters the upper end of the shaft 18, the slots 105 in the tubular piece 102 pass over the ends of the guide pin 98, and the open end of the tubular piece 102 bears upon the clutch ring 94.

When the knurled head 106 has been turned sufficiently to draw the key into its operative position, the clutch ring 94 will have been forced below the pin 95; the slidable interengaging teeth between the clutch ring and the hub permitting sufficient slidable movement. The clutch is then released. By turning the crank 104 clockwise, the piston will be lifted into the upper portion of the cylindrical casing 11, which may then be filled by a grease gun or by lifting the upper portion of the cylinder and the associated mechanism. The upper portion of the cylindrical casing is secured to the lower portion of any suitable fastening means.

In the second form of my invention, the drive wheel 42 is driven by the oscillations of the weight 31 through the eccentric ratchet cam 41, in a manner identical with that previously set forth with reference to the first embodiment. As shown in Fig. 10, the eccentric ratchet cam 41 is suspended from the forward edge of the weight and is almost directly above the brake eccentric cam 54.

It will be seen that I have provided an automatic elevator-guide-rail lubricator which is a compact structure operated directly by the motions of the car which is conveniently rechargeable, and which is adapted to apply heavy lubricants to the rails.

Although I have shown and described a certain specific embodiment of my invention, I am fully aware that many embodiments thereof are possible. My invention, therefore, is not to be restricted in scope except as necessitated by the prior art and by the appended claims.

I claim as my invention:

1. In combination with a lubricator for oiling elevator guide rails, a drive wheel for actuating the lubricator, an oscillatable inertia weight mounted on pivots in axial alignment with said wheel, an eccentric cam pivotally mounted on said weight in cooperative relation to said drive wheel, a biasing spring for rotating the eccentric cam into continuous engagement with the periphery of the drive wheel whereby, upon oscillation of the weight in one direction, the cam will bind upon the drive-wheel and turn it without lost motion and, upon oscillation of the weight in the other direction, the cam will slide over the drive-wheel.

2. In combination with a lubricator for oiling elevator guide rails, a drive wheel for actuating the lubricator, an oscillatable inertia weight mounted on pivots in axial alignment with said wheel, an eccentric cam pivotally mounted on said weight, in cooperative relation to said drive wheel, a biasing spring for rotating the eccentric cam into continuous engagement with the periphery of the drive wheel whereby, upon oscillation of the weight in one direction, the cam will bind upon the drive-wheel and turn it without lost motion and, upon oscillation of the weight in the other direction, the cam will slide over the drive-wheel, a second eccentric cam pivotally mounted

adjacent to the drive wheel, and a biasing spring for continuously urging said second eccentric cam in the same direction of rotation as said first cam into engagement with the periphery of the drive-wheel, whereby said second cam acts as a brake for preventing back rotation of the drive wheel but permits forward movement thereof.

3. In combination with an oscillatable member and a rotatable member, means for driving the rotatable member in one direction of rotation from the oscillatable member without lost motion comprising an eccentric cam pivotally mounted on the oscillatable member, and a biasing spring for rotating the eccentric cam into continuous engagement with the rotatable member, brake means for preventing back rotation of said rotatable member while permitting forward movement comprising a second eccentric cam pivotally mounted adjacent to the rotatable member, and a biasing spring for continuously urging said second eccentric cam in the same direction of rotation as said first cam for engaging the rotatable member.

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