H. H. SCHROYER.

WINDOW LIFTING MECHANISM.

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1,004,208. **Patented Sept. 26, 1911.**

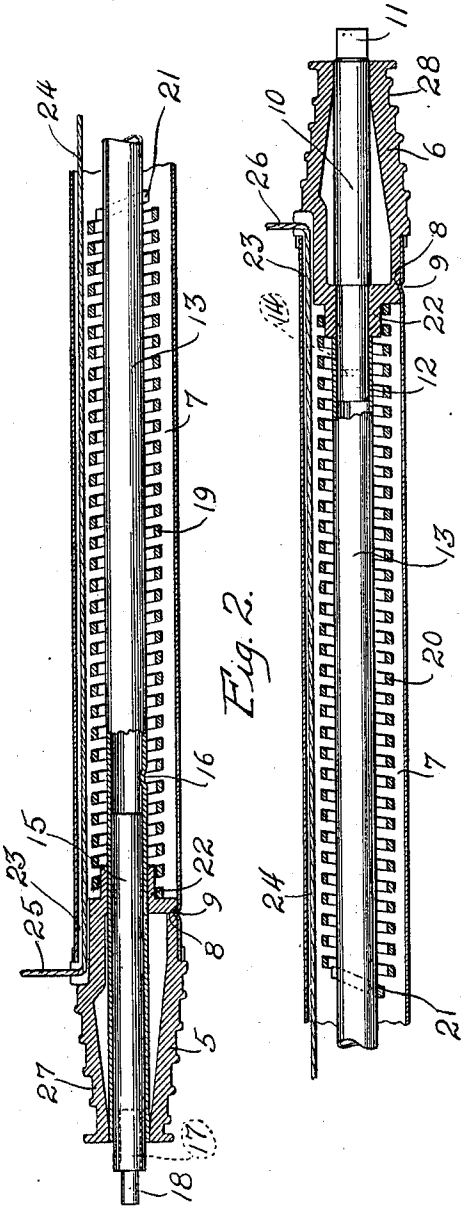

Fig. 2.

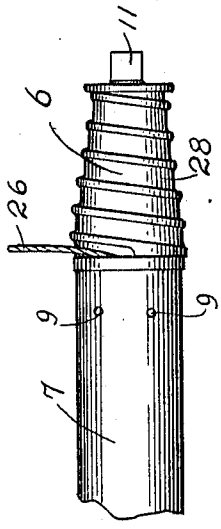

Fig. 1.

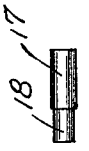

Fig. 4.

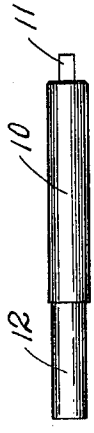

Fig. 3.

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UNITED STATES PATENT OFFICE.

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WINDOW-LIFTING MECHANISM.

1,004,208. Specification of Letters Patent. **Patented Sept. 26, 1911.**

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To all whom it may concern:

Be it known that I, HARRY H. SCHROYER, 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 Window-Lifting Mechanism, of which the following is a specification.

This invention relates to a window lifting mechanism intended particularly for use in connection with the windows of railway cars in which it must occupy the least possible amount of space and at the same time provide the most rigid and most durable construction.

It is intended particularly to provide a lifting mechanism in which the lifting force shall be practically constant for all vertical positions of the window; to provide a lifting mechanism in which the lifting forces at both sides of the sash shall be equal; to provide a mechanism which will automatically and immediately equalize the lengths of the lifting chains when installed thereby insuring that the sash shall hang straight and not jam in the window casing; to provide a form of lifting mechanism which shall comprise a minimum number of parts, each one being of the simplest and cheapest form; and to provide a lifting mechanism which can be immediately accommodated to casings of varying widths thus giving the lifting mechanism a more universal application, standardizing the parts, reducing their cost of manufacture, permitting instantaneous adjustment of the lifting mechanism to any width of casing, and insuring a proper and accurate adjustment of the lifting mechanism within the casing.

Other objects and uses will appear from a detail description of the invention which consists in the features of construction and combination of parts hereinafter described and claimed.

In the drawings Figure 1 shows a side view of my improved lifting mechanism, the lifting chains being completely unwound into position such that their lengths and the tensions on them can be equalized; Fig. 2 shows a cross section taken through the center of the lifting mechanism, the chains being entirely unwound; Fig. 3 shows a detail view of the pin at one end of the lifting mechanism; and Fig. 4 shows a detail view of the pin at the other end of the lifting mechanism.

In the embodiment of my invention I provide an inner tube and an outer casing, the latter being rigidly secured at each end to a suitable form of chain hub. The inner tube is attached at one end to a bearing pin which projects through the hub at that end and is kept from rotation by the manner in which the pin is supported in the casing. At the other end of the inner tube I provide an extension member which projects out through the hub at that end and carries a bearing pin which is suitably socketed in the casing at that side, and by means of which extension member the over-all length between the pins can be varied according to requirements. A helical spring is provided between the inner and outer tubes, and preferably one at each end of the lifting mechanism. This spring, or both if two are used, is connected at one end to the inner non-rotatable tube and at the other end to the hub at that end of the lifting mechanism. Each hub is of suitable form for receiving the lifting chain at that end. The two lifting chains are attached respectively to their hubs in such manner that inequalities either of tension or length which come upon them will be equalized instantaneously when the chains are uncoiled from their respective hubs.

Referring now to the drawings, the hubs are designated by the numerals 5 and 6 respectively. They are connected together by the outer tubing 7 which is rigidly secured to them, and this is preferably done in the following manner: Each hub is preferably provided around its periphery with a plurality of sockets 8 and the tubing 7 is then slid into place over the end of each hub. It is then indented at the points immediately above the sockets 8 so as to form indentations 9 whereby it is held to the hub. Any other suitable form of connection may be used between the tube 7 and the hubs 5 and 6, such for example as a plurality of screws but the construction above described is cheap and satisfactory in other ways.

A pin 10 is provided within the hub 6, this pin extending out beyond the same in the form of a flattened end journal 11 which may be suitably socketed within the casing at that side to prevent rotation of the pin.

The pin extends inwardly at 12 to provide a bearing for the inner tube 13 to which it is rigidly secured as by means of a pin 14. Thus the inner tube is kept from rotation because the pin 10 can not rotate. This inner tube extends through the body of the lifting mechanism and preferably to the outer end of the hub 5 which is rotatably journaled on it. The hub 5 is rigidly secured to the outer tubing 7 in a manner similar to the attachment of the hub 6 thereto; therefore, the hubs 5 and 6 rotate together, the hub 5 being journaled on the inner tube 13 and the hub 6 being journaled on the pin 10. An extension tube 15 fits tightly within the tube 13 at the end of the same which carries the hub 5 and this extension tube may be locked against inward movement in any longitudinal position with respect to the inner tube as by means of an indentation 16. A bearing pin 17 is tightly driven into place or otherwise secured to the outer end of the extension tube 15. Therefore, the extension tube provides means for increasing or decreasing the bearing distance between the ends 11 and 18 of the pins 10 and 17 respectively.

In the construction illustrated I provide two helical springs 19 and 20 respectively, although it will be understood that when desired one of these may be omitted. Each helical spring is rigidly attached at its inner end 21 to the inner tube 13, and at its outer end it is rigidly attached to a shoulder 22 of the corresponding hub. Therefore rotation of the hubs with respect to the inner tube will place the springs under tension.

The equalizing construction which I provide is as follows: Between each hub and the outer tubing 7 I provide a passageway 23 for receiving an equalizing cable 24 to whose ends 25 and 26 respectively I attach the lifting chains. This cable passes clear through the body of the lifting mechanism and, therefore, serves to equalize the lengths of the lifting chains as well as the tensions which come upon them. In order to secure this equalizing effect it is only necessary to completely lower the sash once thereby completely unwinding the chains and permitting the equalizing cable to move the necessary amount longitudinally of the lifting mechanism.

Obviously, when the sash is completely lowered thereby completely unwinding both of the chains the springs will be under the maximum tension and when the sash has been completely raised thereby completely winding up the chains the chains will be under the minimum tension. In order to provide a uniform lifting pull on the chains for all positions of the sash, I provide helical grooves 27 and 28 in the hubs 5 and 6 respectively, these grooves continuously decreasing in diameter as the chains are wound up and thus permitting the springs to transmit their forces to the chain through the minimum radius when the latter are completely wound. As the sash is lowered thereby unwinding the chains and increasing the spring tensions the radii upon which the forces holding the chains act will continuously increase thus insuring a uniform pull on the chains for all positions of the sash.

I claim:

1. In a window-lifting mechanism, the combination of an inner non-rotatable element, hubs suitably journaled thereon adjacent each end thereof, and an outer casing rigidly connecting said hubs, with an equalizing cable passing from end to end of the lifting mechanism, and suitably connected at each end to a lifting chain, substantially as described.

2. In a window lifting mechanism, the combination of a longitudinal rotatable cylinder, a winding drum on each end thereof, and an equalizing element extending from end to end of the cylinder and having its ends secured to a window sash and adapted to wind on the drums, substantially as described.

3. In a window lifting mechanism, the combination of an inner non-rotatable element, an outer rotatable element mounted on the same, and comprising a pair of hubs rigidly secured together, and each provided in its outer face with a spiral groove adapted to the reception of a lifting chain, and each of said spiral grooves in communication at its inner end with a hole extending to the interior of the rotatable element, and an equalizing element spanning the interior of the rotatable element, and extending through said holes and in engagement with said spiral groove and attached to said lifting chains, substantially as described.

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Witnesses:
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