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REMOTE OPERATOR FOR WINDOW ACTUATORS

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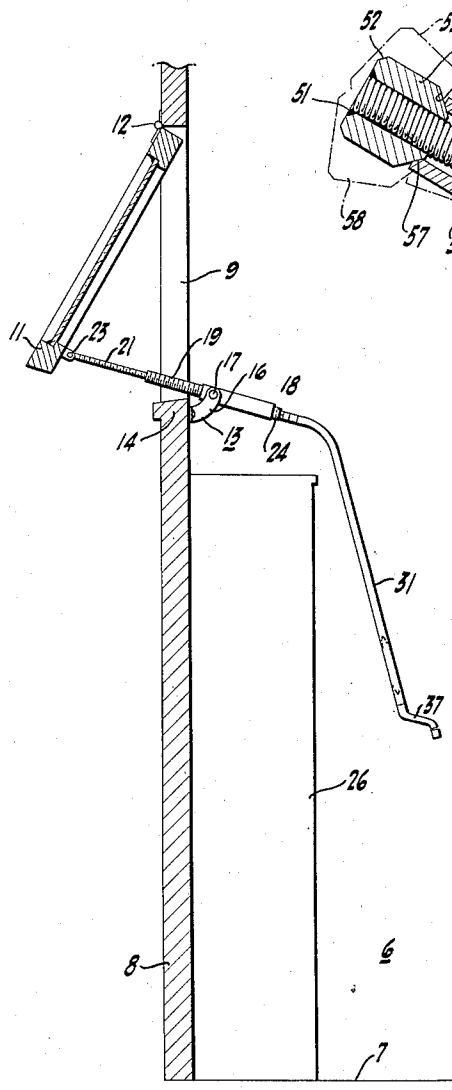


FIG. 1

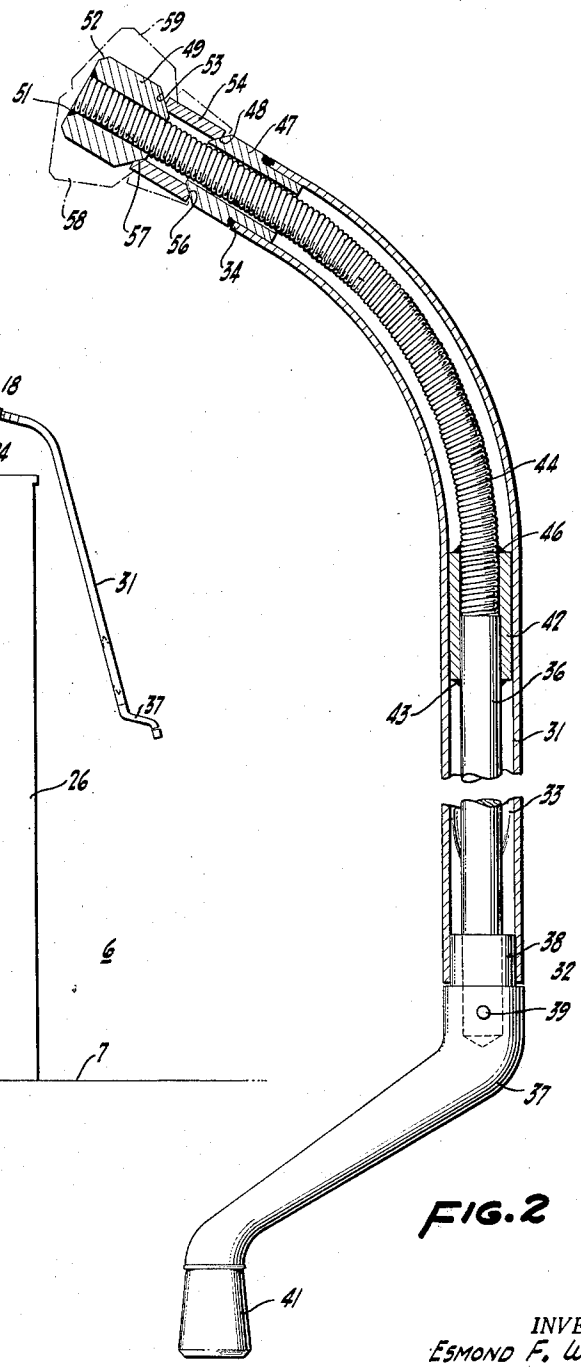


FIG. 2

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REMOTE OPERATOR FOR WINDOW ACTUATORS

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5 Claims. (Cl. 64—2)

My invention relates to an appliance or tool having general usefulness but especially designed to serve as a remote operator for moving windows having mechanical actuators.

Many installations, especially in schools, libraries, commercial buildings and even homes, employ windows in which the window frames are hinged or mounted on linkage so that the window frames swing outwardly at the bottom from the building or window opening. Sometimes a number of window frames, one above the other, are linked together so that when one of them is operated the others follow suit. In some installations also, these windows must for architectural or other reasons be located so as to be somewhat inaccessible. For example, in a library the windows are usually, of necessity, located above and somewhat recessed from the book stacks so that they are not readily approached by a user. Sometimes also windows are installed or located over doors or in other positions not immediately at the hand of the user.

In addition, while individual window frames are often supplied with screw actuators or other mechanisms for moving them into and holding them in any selected position, it is quite customary where a number of windows are linked together to provide a mechanical actuator in order to increase the mechanical advantage so that the user can manipulate the windows without too much effort.

It is an object of my invention to provide a remote operator for window actuators which will make it very simple for the user to engage the actuator even though it is in a relatively remote location and will permit the user easily to operate the window.

Another object of my invention is to provide a remote operator which is easily engaged with the window actuator even though the actuator is at a considerable distance from the user.

Another object of my invention is to provide a remote operator which can easily be adapted for use with any one of several different kinds of window actuators customarily found in the trade.

A still further object of my invention is to provide a very simple, light, reliable remote operator for window actuators so that the users; for example, children in the event of school windows, can quite easily take advantage of the device.

Another object of my invention is in general to provide an improved device for remotely operating window actuators.

Other objects, together with the foregoing, are attained in the embodiment of the invention described in the accompanying description and illustrated in the accompanying drawing, in which:

Figure 1 is a side elevation of a remote operator for window actuators constructed in accordance with my invention and shown in a position of use in a typical installation in a library, the library building being disclosed in cross-section on a vertical plane.

Figure 2 is, for the most part, a cross-section on a median, longitudinal plane through a remote operator constructed in accordance with my invention.

A typical architectural environment is a school or library room 6 having a floor 7 and an outside wall 8 in which a window opening 9 is provided. The opening is not only high above the floor 9 but is displaced behind book shelves 26. Adapted to be moved with respect to the opening 9 is a window frame 11 having a hinge 12 at its upper margin. While but one window is shown and while a hinge connection is shown, it is customary to provide a number of windows, such as the window frame 11, and to have linkages other than the hinge 12. Under any circumstances, it is customary also to have a window actuator, generally designated 13, mounted at some appropriate part 14 of the building wall 8.

A typical actuator 13 includes a bracket 16 secured to the wall and having a transverse pin connection 17 to a tubular housing 18. One or more threaded members 19 and 21 are in engagement with each other for telescopic operation into and out of the housing 18. At one end, the member 21 is connected by a pivot pin 23 to the window frame 11. The actuator 13 in accordance with the present invention instead of having a crank or wheel directly connected to the members 19 and 21 is preferably reconstructed to afford a socket 24 rotatably connected for actuating the members 19 and 21. The socket has a non-circular indentation quite comparable to an ordinary hexagonal socket wrench.

For use in operating the window actuator 13 remotely, for example, by a person standing on the floor 7 and unable to reach any part of the actuator, I provide a structure inclusive of a hollow staff 31, preferably constructed of relatively light tubing, such as aluminum or magnesium metal, or even relatively stiff plastic, and provide the staff 31 in any suitable contour. In the present instance, the staff adjacent one end 32 is substantially straight and is indented at the sides to provide a handle portion 33. Adjacent its other end 34 the staff is given any suitable configuration and in the present instance the end 34 is curved on an arcuate path, especially designed to afford adequate clearance over the upper corner of the book stacks 10.

Within the straight portion 31 of the staff I provide a rod 36 of light metal, preferably, which at its lower end depends below the end 32 of the staff. Journalled in the lower end of the staff is a crank 37 having a bearing portion 38 rotatable freely within the hollow staff 31. Preferably, the shaft is countersunk within the end of the crank. Adjacent the bearing portion the crank has a cross pin 39 for securing the crank to the shaft 36. The offset portion of the crank terminates in a rotatable handle 41 in the customary way so that upon rotation of the handle 41 the rod 36 is rotated within the tube 31.

The other end of the rod 36 is preferably received in a sleeve 42 having a free running fit within the straight part of the staff and therefore serving as a journal or bearing support. The sleeve 42 is preferably secured to the rod 36 by solder 43 or other comparable fastening means.

Traversing the curved portion of the staff and in engagement with the sleeve 42 is a flexible shaft 44, preferably comprised of a helix of metal wire in the customary way and of approximately the same diameter as the rod 36. One end of the flexible shaft 44 is inserted into the sleeve 42 and preferably is secured thereto by solder 46. The flexible shaft 44 is of whatever extent and curvature is necessary so that it traverses freely the curved end portion of the staff.

Serving as a guide and support adjacent the end 34 of the staff is a guide member 47, preferably comprising a thimble of metal or plastic which has a reduced portion

fitting within the end of the staff. The guide member 47 can fit snugly within the staff or even be soldered thereto but preferably can fit loosely inside the staff to afford some lateral flexibility, although it is substantially confined axially. The guide member 47 is quite free with respect to the flexible shaft so that it serves as a guide for positioning the shaft but does not bind or cramp the shaft. The outermost end of the guide member 47 is provided with a domed contour 48. This is shown in the drawings as a conical surface since that is the easiest to manufacture and, within the tolerances usually required, is satisfactory although a curved or spherical surface is utilized where the tolerances are somewhat closer and the sizes are larger.

Spaced from the guide member 47 at a convenient distance is a driving member 49, preferably constituted of a metallic body having an exterior contour designed to fit easily into the socket 24 and in the present instance constituted by a non-circular member hexagonal in cross-section. The driving member 49 is fast on the end of the flexible shaft 44, being secured thereto by solder 51. The driving member at its outer corners is beveled or tapered, as at 52, so that it readily can be engaged with the socket 24. The driving member on its opposite end is preferably also provided with a domed end 53 which, as illustrated in a relatively small device with coarse tolerances, is conveniently made as a conical surface but which in larger and more precise manufacture is preferably a spherical surface.

Interposed between the two domed ends 48 and 53 is a tubular spacer 54, preferably a metal or plastic tube, encompassing the flexible shaft 44 and having beveled ends 56 and 57 mating with the surfaces 53 and 48. Again, for economy in manufacture and with coarse tolerances the surfaces 56 and 57 are conical but in a more refined version these surfaces are preferably also rounded.

There is some freedom of movement between the various parts of the structure adjacent the driving member 49 so that this driving member is flexibly mounted and can move between extreme positions of the sort illustrated by the broken lines 58 and 59 in Figure 2. However far the lateral displacement of the driving member may be from the rotational axis of the confined part of the flexible shaft 44, the spacer 54 nevertheless acts as an axial support so that the driving member cannot approach more closely to the end 47 of the staff. The flexible shaft 44 while a relatively stiff member axially, nevertheless has considerable lateral flexibility and is slightly springy so that the parts of the flexible construction are readily adjustable and maneuverable yet retain a good engaging and driving relationship.

In the use of the device as shown in Figure 1, the user grasps the indented handle 33 in one hand and the crank 41 in the other. The socket 24 is approached by the driving member 49 and entrance and interengagement are readily effectuated since the driving member is flexibly mounted in a lateral direction although a firm axial engagement is made because the spacer 54 backs up the driving member. As soon as the driving member and the socket are interengaged, the user rotates the handle 41 in either direction to provide the desired motion of the window actuator 13. At the conclusion of the operation, the actuator is withdrawn to disengage the driving member 49 from the socket 24, the flexible shaft being sufficiently stiff to hold the parts axially in place while this is being accomplished.

What is claimed is:

1. A remote operator for window actuators comprising a hollow staff having a straight portion at one end and a curved portion at the other end, a rod within said straight portion, a crank journalled in said straight portion and fastened to said rod, a sleeve within said straight portion and engaging said rod, a flexible shaft including a wire helix located within said curved portion and engaging said sleeve, a guide member fastened to the end of said curved portion and encompassing said flexible shaft, said guide member having a domed end, a driving member secured to the end of said flexible shaft and having a domed end, and a tubular spacer disposed between said members and encompassing said flexible shaft, said spacer being contoured to abut and slidably to engage with said domed ends.

2. A remote operator for window actuators comprising a hollow staff having a handle portion adjacent one end and a curved portion at the other end, a crank mounted on said one end, a flexible shaft including a wire helix projecting from said other end, means for connecting said crank and said flexible shaft, a driving member spaced from said other end, means for connecting said flexible shaft and said driving member, and a loose tubular spacer encompassing said flexible shaft and interposed between and transversely movable relative to said end and said driving member.

3. A remote operator comprising a rigid hollow staff, a crank journalled in one end of said staff, a rod within said staff and secured to said crank, a driving member having a domed end disposed toward said staff, a hollow guide member fastened on the other end of said staff and having a domed end disposed toward said driving member, a tubular spacer at its opposite ends abutting and laterally slidable on the respective one of said domed ends, and a wire helix flexible shaft secured to said rod and to said driving member for holding said driving member in abutment with said spacer and said spacer in abutment with said guide member.

4. A remote operator comprising a rigid, hollow staff; a crank journalled in and abutting one end of said staff; a hollow guide member having a domed end fastened on the other end of said staff; a driving member having a domed end; a tubular spacer interposed between and laterally slidable on said domed ends; and means including a springy, flexible shaft passing through said spacer, said guide member and said staff and connected to said driving member and to said crank.

5. A remote operator comprising a rigid hollow staff; a crank journalled in and abutting one end of said staff; a hollow guide at the other end of said staff and having a transverse sliding surface; a driving member having a transverse sliding surface; a tubular spacer interposed between said transverse sliding surfaces and laterally slidable on said driving member and on said hollow guide; and means including a springy, flexible shaft passing through said guide, said spacer and said staff and connected to said driving member and said crank.

References Cited in the file of this patent

UNITED STATES PATENTS

1,138,926	Bernett	May 11, 1915
1,300,148	Evans	Apr. 8, 1919
1,866,714	King	July 12, 1932
1,903,660	Smith et al.	Apr. 11, 1933
2,511,049	Coldwell	June 13, 1950