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MECHANICAL OPERATOR FOR AWNING TYPE WINDOWS

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2 Sheets-Sheet 1

Fig. 1.

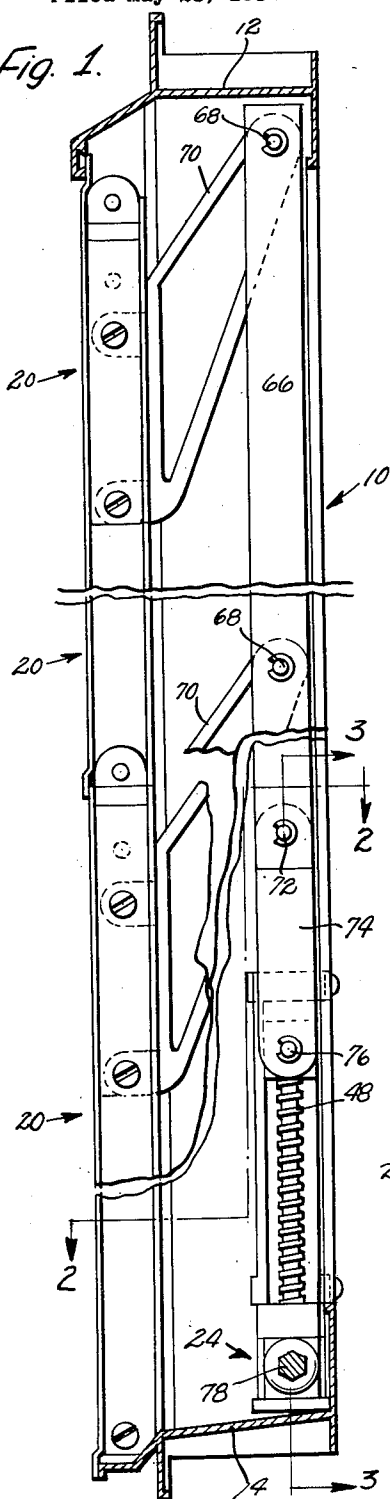
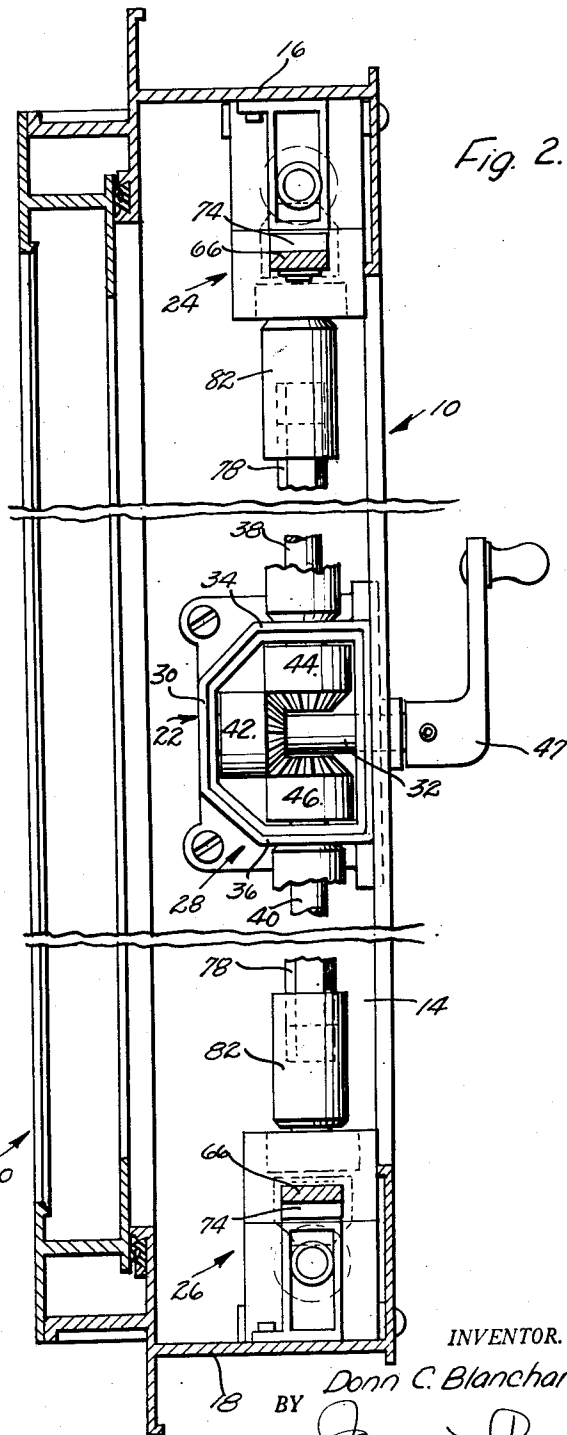


Fig. 2.



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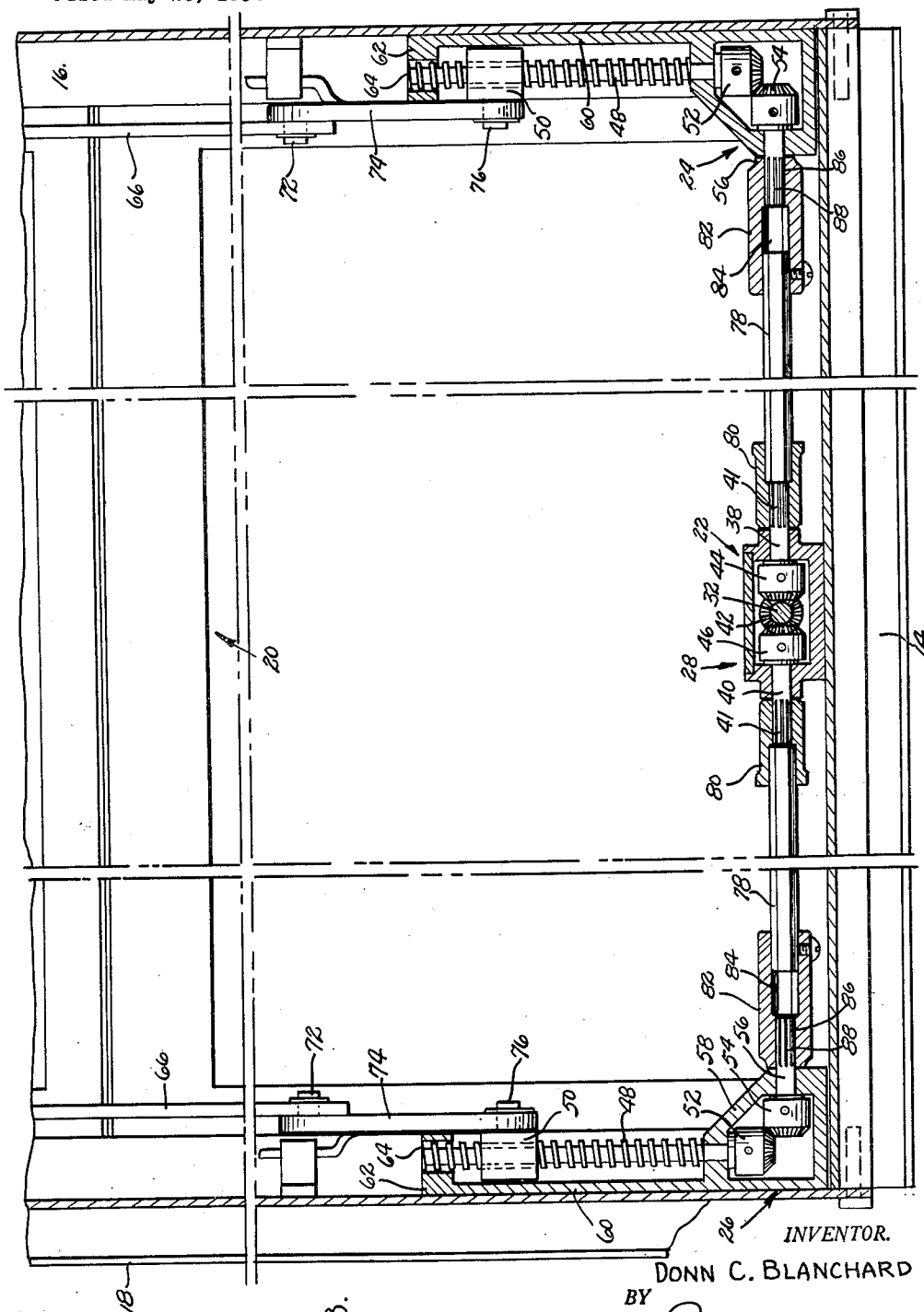


FIG. 3.

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MECHANICAL OPERATOR FOR AWNING TYPE WINDOWS

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4 Claims. (Cl. 268—23)

This invention relates to new and useful improvements in mechanical operators for awning type windows and the primary object of the present invention is to provide a center type operator for awning windows, whereby a plurality of ventilators may be simultaneously actuated.

Another important object of the present invention is to provide a center operator for awning type windows including a pair of actuating bars and novel and improved means, whereby said bars may be moved relative to one another for assuring positive weathering contact of the vents, at both ends, against the jamb of a window frame.

Another object of the present invention is to provide a center operator for awning windows that is quickly and readily secured to or removed from the sill and jamb of a window frame in a convenient manner.

Yet another object of the present invention is to provide an operator of the aforementioned character including a pair of power driven screws and novel and improved means operatively connecting the screws to a plurality of vertically spaced window sections.

A further object of the present invention is to provide a center type operating mechanism for awning windows, which mechanism is composed of three compact gear units that may be quickly and readily operatively engaged, whereby a crank handle operatively connected with one of the gear units may be employed for actuating all units simultaneously.

A still further aim of the present invention is to provide an operating mechanism that is extremely simple and practical in construction, strong and reliable in use, efficient and durable in operation, inexpensive to manufacture and otherwise well adapted for the purposes for which the same is intended.

Other objects and advantages reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a vertical sectional view through an awning type window utilizing the window operator which is the subject of the invention, intermediate portions of the window being omitted;

Figure 2 is an enlarged transverse horizontal sectional view taken along section line 2—2 of Figure 1 and shows the general details of the window operator, intermediate portions of the window being omitted; and,

Figure 3 is a fragmentary vertical sectional view taken along section line 3—3 of Figure 1 and shows the adjustable feature of the window operator, intermediate portions of the window being omitted.

Referring now to the drawings in detail, wherein for the purpose of illustration, there is disclosed a preferred embodiment of the present invention, the numeral 10 represents an awning window structure generally, including a head 12, sill 14 and jambs 16 and 18.

A plurality of vertically spaced ventilators or window sections 20 are pivotally mounted on the jambs 16 and

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18 for vertical swinging movement about horizontal pivots.

Means is provided for imparting simultaneous movement to the plurality of ventilators and this means comprises a central operating mechanism which is composed of a central gear unit 22 and a pair of similar end gear units 24 and 26.

Central gear unit 22 includes a casing or housing 28 having a centrally apertured rear wall 30 that rotatably supports a drive stub shaft 32, and casing 28 is also provided with spaced parallel, substantially centrally apertured side walls 34 and 36 that rotatably support coaxially arranged driven stub shafts 38 and 40 having externally splined outer ends 41.

A central drive gear 42 is suitably fixed on stub shaft 32 and a pair of facing driven beveled gears 44 and 46 are suitably fixed on the stub shafts 38 and 40 and mesh with drive gear 42, whereby rotation of central gear 42 will reflect rotation of driven gears 44 and 46. The drive stub shaft 32 has removably mounted thereon a crank 47 to facilitate rotation thereof.

End gear units 24 and 26 are identical in construction so that the same may be inter-changeable. Each of the units 24 and 26 rotatably supports a vertical screw or worm 48 having a travelling nut 50 receivably engaged thereon. The lower ends of the screws 48 fixedly support beveled gears 52 that mesh with complemental beveled gears 54 on driven stub shafts 56 rotatably positioned in apertures in an end wall of each supporting portion 58 of the units 24 and 26.

The supporting portions 58 have vertically extending legs 60 disposed within the jambs 16 and 18. The legs 60 terminate in blocks 62 having vertical bores 64 therethrough. The bores 64 guidingly receive upper ends of the screws 48 to prevent twisting thereof.

In order to facilitate the simultaneous opening and closing of window sections 20, there is mounted in the jambs 16 and 18 vertically disposed actuating bars 66. The actuating bars 66 have pivotally received therein at vertically spaced intervals pins 68 of actuator brackets 70 carried by upper portions of the window sections 20 at opposite sides thereof. Connected to lower ends of the actuating bars 66 by pivot pins 72 are operator links 74. The lower ends of the operator links 74 are pivotally connected to the travelling nuts 50 by pivot pins 76 carried thereby. It is readily apparent that as the travelling nuts 50 move up and down the actuating bar 66 result in the closing and opening of the window sections 20.

Disposed between the central gear unit 22 and the end gear units 24 and 26 and connecting the same are connecting shafts 78. The connecting shafts 78 are multi-sided or non-circular in cross section and have slidably mounted on inner ends thereof tubular connectors 80. The tubular connectors 80 are also received over the splined ends of the stub shafts 38 and 40 to connect the connecting shafts 78 in driven relation to the stub shafts 38 and 40.

Removably carried by outer ends of the connecting shafts 78 by set screws or the like are tubular connectors 82. Each of the tubular connectors 82 is provided at its inner end with an elongated multi-sided socket or bore 84 of a cross section to receive a connecting shaft 78. It is to be noted that the connecting shafts 78 are only partially received in the bores 84 and are removably held therein as by the aforementioned set screws.

In certain instances one side of a plurality of window sections 20 have a tendency to close before the other. In order to compensate for this, it is merely necessary to set the actuating bar 66 for the other sides of the window sections 20 in advance of the other actuating bar 66. This is accomplished by disconnecting the end gear unit for the particular actuating bar 66 from the central gear

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unit 22 by loosening the set screw of adjacent connector 82 and shifting the selected one of the connecting shafts 78 axially of the connector 82 to an inoperative position whereby its end is removed from the accommodating connector 80. The selected connecting shaft 78 is then merely rotated a slight amount and its ends are then moved back to its normal operating position within the accommodating connector 80 and the set screw of connector 82 tightened.

The connectors 80 and 82 are shown splined upon their supporting stub shafts and held thereon by set screws. It is further anticipated that connectors 80 and 82 may be keyed or otherwise held secured to the stub shafts with or without the use of splines inasmuch as other conventional methods for affixing the connectors to the stub shafts may be employed without affecting the intended operation described.

Through the provision of a separate central gear unit 22 and end gear units 24 and 26 which may be easily mounted in a window frame and removable drive shafting, it will be readily apparent that the mounting of the operating mechanism is greatly facilitated. Further, the provision of removable drive shafting permits the ready adjustment of the various gear units so that they may be synchronized to properly control the operation of the operating mechanism and the opening and closing of the window sections 20. It is also to be understood that the structure of the window operating mechanism is such to permit its concealment in the window frame.

It is noted that the use of relatively short screws in conjunction with elongated actuating bars for plural vent operation reduces considerably the costly previously known process of utilizing screws which extend for the major height of the jambs, and which have spaced interdependent connection with the various vents. The disclosed construction, therefore, provides a more positive, practical and economical connection between the actuating linkage or slide bar and the powered screws.

It is to be understood that while a preferred form of the device has been illustrated, changes are contemplated as readily fall within the spirit of the invention as determined by the scope of the appended claims.

What is claimed as new is:

1. In an awning type window including a plurality of vertically spaced horizontally swingable ventilators, an operating mechanism for the ventilators comprising a central gear unit composed of a pair of facing beveled driven gears and a central drive gear meshing with said driven gears, a pair of spaced parallel vertical screws, elongated actuating bars pivotally connected to said ventilators for activating the latter, means operatively connecting said screws to said actuating bars for imparting rectilinear motion to the latter during rotation of said screws, a pair of end gear units of which includes first and second relatively perpendicular and meshing gears, said first gears being fixed to said screws, externally splined stub shafts fixedly supporting said second gears, tubular connectors carried by the stub shafts and a pair of coaxial drive shafts having inner ends operatively and detachably engaged with said driven gears, and said drive shafts having outer ends telescopically engaged with the connectors of said stub shafts.

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2. A window operating mechanism comprising a gear unit, a driven stub shaft operatively connected to said unit and having an end portion with a multi-sided socket portion, a ventilator actuating bar, means operatively connected to said bar for actuating the latter and including a stub shaft disposed coaxial with the first named stub shaft, a connector carried by the last named stub shaft and having a multi-sided socket; and a connector shaft having multi-sided end portions telescopically and removably engaged within the socket portions of said stub shafts.

3. A window operating mechanism comprising a gear unit including a pair of facing driven beveled gears, and a center drive gear meshing with said driven gears, a first pair of coaxial stub shafts fixed to said driven gears and having outer end portions provided with multi-sided sockets, a pair of ventilator actuating bars, means operatively connected to said bars for actuating the latter and including a second pair of driven stub shafts disposed coaxial with and spaced from the first named shafts and having multi-sided sockets carried on their outer ends, and a pair of multi-sided tubular shafts having inner ends telescopically engaged with said first named sockets and outer ends telescopically engaged with said second named sockets.

4. A window operating mechanism comprising a gear unit including a pair of facing driven beveled gears, and a center drive gear meshing with said driven gears, a first pair of coaxial stub shafts fixed to said driven gears and having outer end portions, connectors secured to the outer end portions of said shafts and having multi-sided sockets, a pair of ventilator actuating bars, means operatively connected to said bars for actuating the latter and including a second pair of driven stub shafts disposed coaxial with and spaced from the first named shafts, a second pair of connectors secured to said second pair of shafts and having multi-sided sockets, and a pair of shafts having inner multi-sided ends telescoped within the first named sockets, said shafts having outer multi-sided ends telescoped within the sockets of said second pair of connectors, said means including a pair of vertical screws, travelling nuts on said screws operatively connected to said bars, said second pair of stub shafts being operatively engaged with said screws to impart rotation to the latter, and said connectors being slidable in the second named sockets and removable from the first named sockets and to thereby permit rotation of one screw independently of the other.

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