

Jan. 14, 1958

R. WARDLAW
DOOR CONTROL DEVICE

2,819,628

Filed Aug. 16, 1954

2 Sheets-Sheet 1

FIG. 1

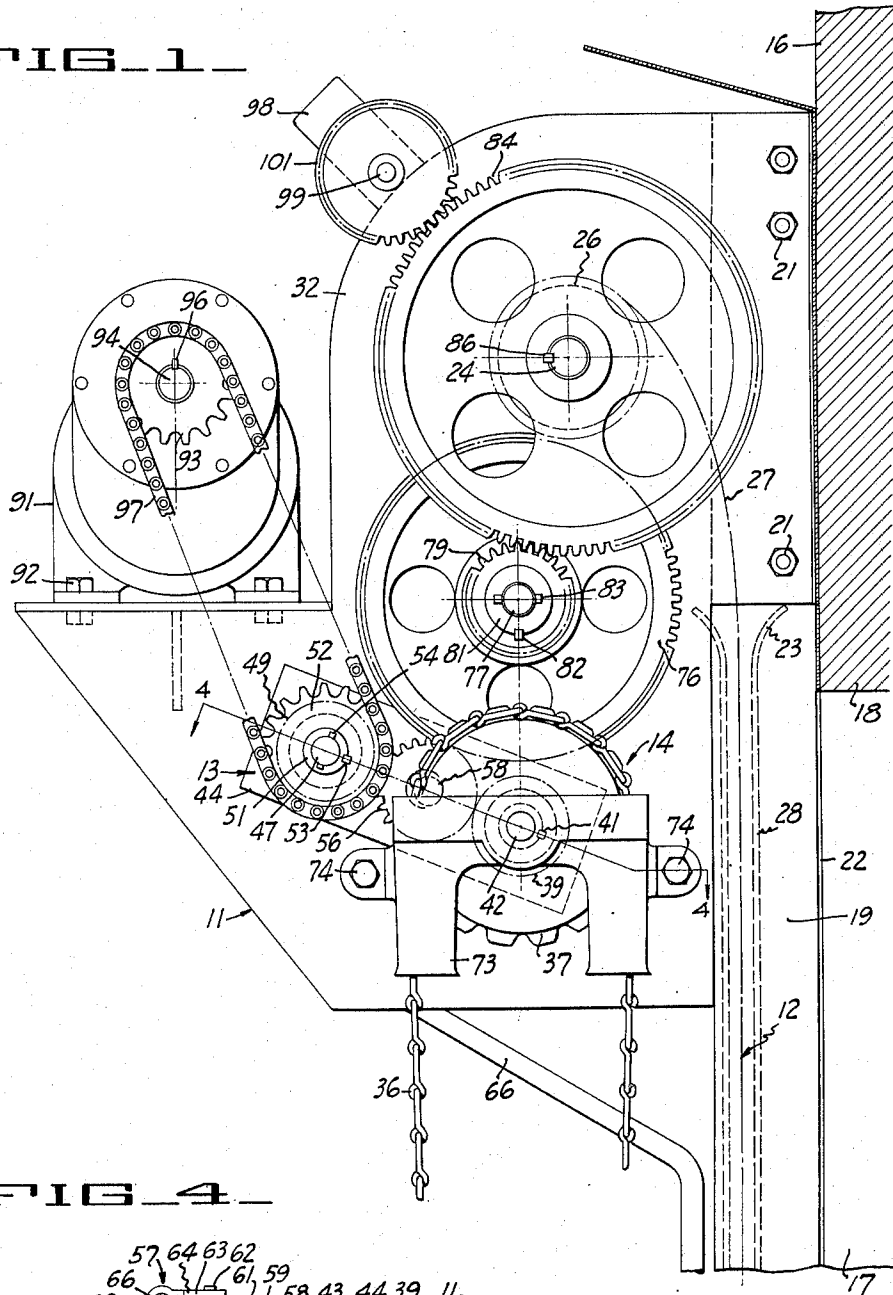
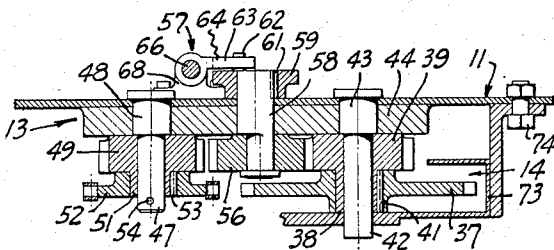


FIG. 4



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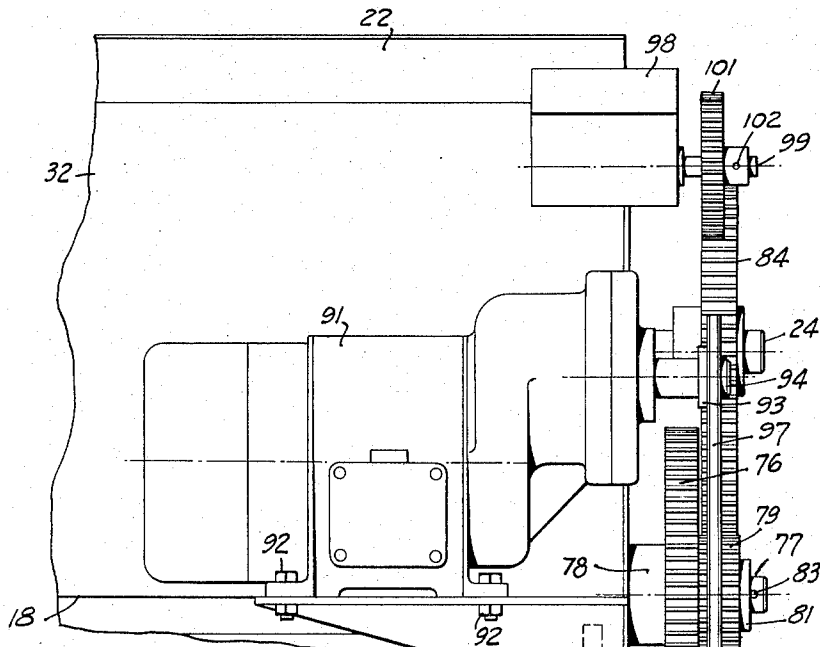
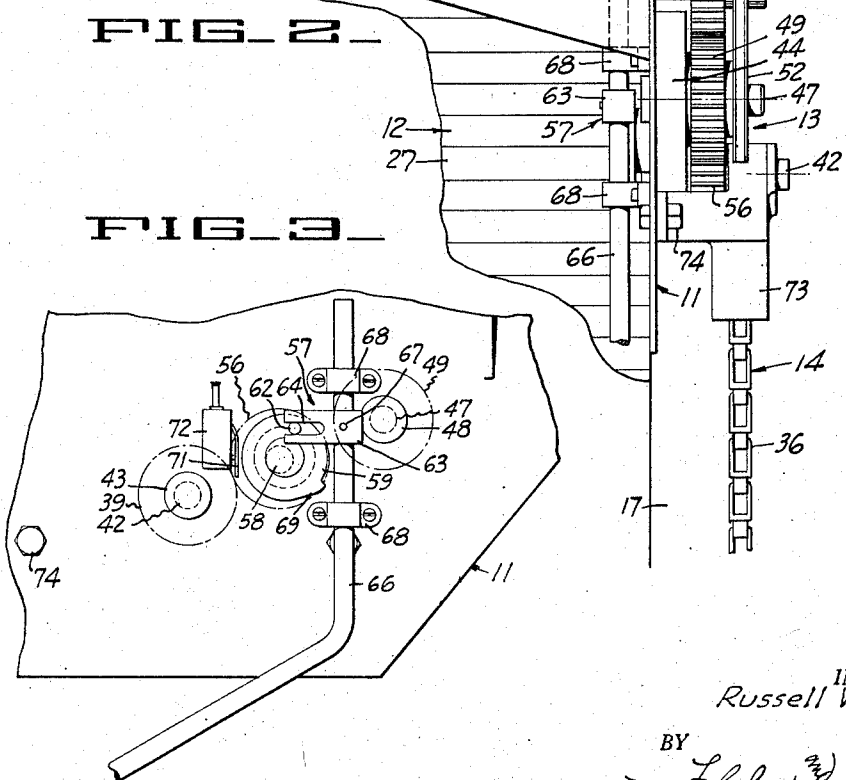


FIG. 2

FIG. 3



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DOOR CONTROL DEVICE

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5 Claims. (Cl. 74—625)

This invention relates generally to rolling doors and more particularly to devices for operating rolling doors.

In the past, rolling doors have been provided with power operated means for closing and opening the same, but often no provision has been made for opening and closing the doors in the event of power failure or motor trouble. Devices which have made provisions for such contingency have in general been rather elaborate and expensive.

In general, it is an object of the present invention to provide a power operated door control mechanism which can be operated by hand in the event of power failure or motor trouble.

A further object of the invention is to provide a device of the above character in which power operated means and hand operated means are provided for door control.

A further object of the invention is to provide a device of the above character in which the motor may be removed without interfering with the hand operated means.

Another object of the invention is to provide a device of the above character in which the power operated means is disconnected during operation of the hand operated means.

Additional objects of the invention will appear from the following description in which the preferred embodiment of the invention has been set forth in detail in conjunction with the accompanying drawing.

Referring to the drawing:

Figure 1 is a side elevational view illustrating the door control device incorporating the present invention.

Figure 2 is a front elevational view of the door control device shown in Figure 1.

Figure 3 is a partial side elevational view of my device on the side opposite that shown in Figure 1.

Figure 4 is a cross-sectional view taken along the line 4—4 of Figure 1.

In accordance with the present invention, I employ power operated means associated with reduction gearing for operating a rolling door and hand operated means associated with the same reduction gearing for operating the same rolling door in the event of power failure, motor trouble and the like. The hand operated means is so connected to the motor operated means that when the hand operated means is being used for opening or closing the rolling door, the motor operated means is disconnected and cannot be energized.

The embodiment of my door control device shown in the drawing consists of an angular support bracket 11 which serves as a mounting for the rolling door 12, the power operated mechanism 13 for controlling the rolling

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door, and the hand chain mechanism 14 for also controlling the door. The angular brackets 11 are mounted on the wall 16 on the opposite sides of the opening formed by door jambs 17 and near the lintel level 18 so that the rolling door can be raised above the lintel level. Mounting can be accomplished by any suitable means such as by fastening the bracket 11 to the wall angles 19 by means of bolts 21. The wall angle can be fastened to the wall plate 22 by any suitable means such as light screws or bolts.

The rolling door 12 may be of conventional construction wherein a main shaft 24 is suitably journaled in the brackets 11, and a barrel 26 is fixed to the shaft 24 and is coaxially aligned with the same. A curtain 27 formed of interlocking slats fabricated from a suitable material such as cold rolled strip steel is adapted to be wound upon the barrel 26 as the main shaft 24 is turned in a counterclockwise direction as viewed in Figure 1. The sides of the curtain 27 are adapted to run in curtain guides 28 which may be fastened to the wall angles 19 by any suitable means such as bolts. The tops of the guides are well flared at 23 to facilitate entry of the curtain. The entire curtain barrel assembly is covered by a hood 32 which can be fabricated from sheet steel and attached to the brackets by means of bolts or screws (not shown).

The main shaft 24 is adapted to be rotated by either the power operated mechanism 13 or the hand chain mechanism 14 as hereinafter described.

The hand-chain operated mechanism 14 consists of a hand chain loop 36 which has one end looped about and engaging the teeth on the chain sprocket 37. The chain should be of sufficient length so that it can be reached with ease by a person standing on the floor near the door. The sprocket 37 is mounted on and coaxially aligned with respect to a projecting flange 38 on pinion 39 and is fixed thereto by means of key 41. The pinion 39 is journaled on a shaft 42. Shaft 42 is provided with a collar 43 which is mounted in the bracket 11 and one end of reinforcing member 44 in such a manner as to prevent rotation of the shaft 42. The reinforcing member can be attached to bracket 11 by any suitable means such as welding.

A shaft 47 having a collar 48 is mounted in the other end of the reinforcing member 44 and bracket 11 so as to prevent rotation of the shaft 47. A pinion 49 is journaled on shaft 47 and has a projecting flange 51 which is coaxially aligned with chain sprocket 52 and serves to mount the same. The chain sprocket 52 is fixed to the flange 51 by means of key 53 and pin 54 serves to prevent the sprocket 52 and pinion 49 from slipping off of the shaft 47.

Intermediate the pinions 39 and 49, I have provided spur gear 56 which is adapted to be moved into meshing engagement with either of the pinions 39 or 49 by means of a Scotch yoke mechanism 57. The spur gear 56 is journaled on an eccentric shaft 58 which is rotatably mounted in the bracket 11 and the reinforcing member 44 whereby upon rotation of shaft 58 spur gear 56 will be moved into engagement with either pinion 39 or pinion 49. The other end of the shaft 58 is provided with a cam member 59 which is fixed to shaft 58 by suitable means such as key 61. The cam member 59 is provided with a projecting pin 62 which is mounted off center and which forms a portion of the Scotch yoke mechanism 57. The Scotch yoke mechanism consists of a yoke member

63 provided with a slot 64 which engages pin 62. The yoke member 63 is fixed to an operating rod 66 by suitable means such as a set screw 67. The operating rod 66 is limited to vertical motion by means of the brackets 68. The operating rod 66 should be of such a length so that it can be easily reached by a person standing on the floor near the door. Additional means may be provided for fixing the vertical position of the rod in any one of two predetermined vertical positions for a purpose hereinafter described.

The cam member 59 is provided with a projecting lug 69 which is adapted to engage the operating member 71 of a normally open "microswitch" 72 when the operating rod 66 is in its lowermost predetermined position for a purpose hereinafter described.

A chain guard 73 is provided for preventing the hand chain 36 from jumping off of the sprocket wheel 37 and may be attached to the bracket 11 by suitable means such as bolts 74. The guard 73 also serves to prevent the pinion 39 and the sprocket wheel 37 from slipping off of the shaft 42.

Additional reduction gearing may be utilized for driving the main shaft 24 from the sprocket wheel 37, the amount of reduction gearing being dependent upon the weight of the curtain 27. In this instance I have provided a gear 76 which is adapted to mesh with the spur gear 56 and which is journaled on a shaft 77 attached to bracket 11 by means of a mounting 78. A pinion 79 is coaxially aligned with and is mounted on the projecting flange 81 of gear 76 and is fixed thereto by means of key 82. Pin 83 serves to prevent gear 76 and pinion 79 from slipping off of shaft 77. Pinion 79 meshes with a gear 84 which is fixed to main shaft 24 by means of key 86.

The power operated mechanism 13 consists of a gearmotor 91 which is mounted upon the bracket 11 by suitable means such as bolts 92. A chain sprocket 93 is keyed to the output shaft 94 of the gearmotor 91 by means of key 96. Chain sprocket 93 is connected to the chain sprocket 52 by means of roller chain 97.

A cam operated limit switch 98 is associated with the gear 84 and is mounted on the hood 32 for a purpose hereinafter described. Its operating shaft 99 is fastened to a gear 101 by means of pin 102 and gear 101 is meshed with gear 84.

Operation of the door control device may be briefly described as follows: Let it be assumed that the spur gear 56 is in the position shown in Figure 1 where it is shown to be in engagement with pinion 39. In this position, the curtain 27 is adapted to be raised or lowered by means of hand chain 36. Assuming that the curtain 27 is in a lowered position and it is desired to raise the same, the chain 36 is pulled in such a manner that the sprocket 37 is rotated in a clockwise direction. Rotation of the sprocket 37 in a clockwise direction rotates pinion 39 in a clockwise direction which in turn causes spur gear 56 to rotate in a counterclockwise direction. Rotation of the spur gear 56 in a counterclockwise direction causes clockwise rotation of gear 76 and pinion 79. Clockwise rotation of pinion 79 causes counterclockwise rotation of gear 84 which causes the curtain 27 to be rolled upon the barrel 26. Rotation of the sprocket wheel 37 is continued until the curtain is raised to the proper height. The curtain 27 can be lowered by pulling the chain 36 in an opposite direction.

It will be noted that when the yoke member 63 is in its uppermost position, as shown in Figure 3, that the projecting lug 69 is not in contact with the operating member 71 of the normally open "microswitch" 72. The microswitch 72 is connected into the circuit for energizing the gearmotor 91 and hence until the "microswitch" is closed by operation of projecting lug 69, the gearmotor 91 cannot be energized. Thus, when the cam member 59 is in the position shown in Figure 3, the gearmotor cannot be energized.

If it is desired to raise or lower curtain 27 by power

operated means, it is merely necessary to pull the operating rod 66 to its lowermost position which operation serves to urge the yoke 63 downwardly which causes counterclockwise rotation of the cam member 59 and the eccentric shaft 58, as viewed from Figure 1, to cause the spur gear 56 to move into engagement with pinion 49 and out of engagement with pinion 39. At the same time projecting lug 69 is moved towards the operating member 71 which is operated to close "microswitch" 72.

The curtain 27 can now be raised and lowered by energizing the gearmotor 91 by means of a suitably located starter (not shown). Assuming that the curtain is in its lowermost position and it is desired to raise the same, the gearmotor 91 is energized so it will rotate in a forward or clockwise direction causing the sprocket wheel 52 and the pinion 49 to rotate in a clockwise direction. Clockwise rotation of pinion 49 causes counterclockwise rotation of spur gear 56. Counterclockwise rotation of spur gear 56 causes clockwise rotation of gear 76 and pinion 79 which in turn causes counterclockwise rotation of gear 84. Counterclockwise rotation of gear 84 serves to roll the curtain 27 upon the barrel 26.

Raising and lowering of the curtain 27 is automatically stopped when the curtain 27 has been raised to its uppermost position or lowered to its lowermost position by limit switch 98 which de-energizes the gearmotor 91. The limit switch 98 is provided with a pair of contacts which are connected into the gearmotor circuit. They are opened by cams (not shown) when the curtain has reached its uppermost position and also when it has reached its lowermost position. The cams are connected to operating shaft 99 and thus are positioned by movement of the gear 84.

When it is desired to lower the curtain, it is merely necessary to reverse the direction of rotation of the gearmotor 91 by means of the starter (not shown).

Normally, the curtain 27 would be controlled by the power operated mechanism 13 and the hand chain mechanism 14 would be used only for emergency operation. In this manner, it is still possible to operate the curtain in the event of power failure or motor trouble.

It will be apparent from the foregoing that I have provided a door control device with power operated means which can be manually operated in the event power operated means fails.

I claim:

1. In a device for raising and lowering a rolling door of the type wherein the door includes a curtain adapted to be rolled about a main horizontal shaft, the device comprising a bracket, a gear train consisting of three gears lying in a single plane and mounted on said bracket, hand operated means associated with the first of said gears for rotating the first of said gears, motor operated means associated with the second of said gears for rotating the second of said gears, means for moving the third of said gears in said plane and into engagement with either of said first or second gears, and reduction gearing adapted to connect said third gear to said main shaft, said reduction gearing being in continuous engagement with said third gear.

2. A device as in claim 1 wherein said means for moving the third gear includes an eccentric mounting for said third gear.

3. In a device for raising and lowering a rolling door of the type wherein the door includes a curtain adapted to be rolled about a main shaft, the device comprising a bracket, a gear train mounted upon said bracket, said gear train consisting of a pair of stub shafts mounted on said bracket, a first gear journaled on one of said stub shafts, a second gear journaled on the other of said stub shafts, a third shaft journaled in said bracket, one portion of said shaft being eccentric to the remainder of said shaft, a third gear rotatably mounted on the eccentric portion of said third shaft, hand operated means associated with the first of said gears for rotating the first of said gears, motor

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operated means associated with the second of said gears for rotating the second of said gears, and means for rotating said third shaft to move said third gear into engagement with either of said first or second gears, and reduction gearing continuously engaging said third gear and adapted to connect said third gear to said main shaft. 5

4. A device as in claim 3 wherein said means for rotating said third shaft includes Scotch-yoke means consisting of a cam member fixed to said third shaft, a pin mounted off center on said cam member, a yoke engaging said pin, and means for vertically reciprocating said yoke. 10

5. A device as in claim 4 together with means for pre-

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venting operation of said motor operated means when said gear is in engagement with said first gear, said means comprising a switch adapted to be operated by said cam member.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,819,628

January 14, 1958

Russell Wardlaw

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

In the grant, lines 2 and 12, and in the heading to the printed specification, lines 3 and 4, name of assignee, for "Coolsson Company", each occurrence read -- Cookson Company --.

Signed and sealed this 22nd day of April 1958.

(SEAL)
Attest:

KARL H. AXLINE
Attesting Officer

ROBERT C. WATSON
Commissioner of Patents