July 3, 1928. 1,676,064

C. E. VREELAND

CLOSURE OPERATING MECHANISM

Filed April 1, 1925 2 Sheets-Sheet 1

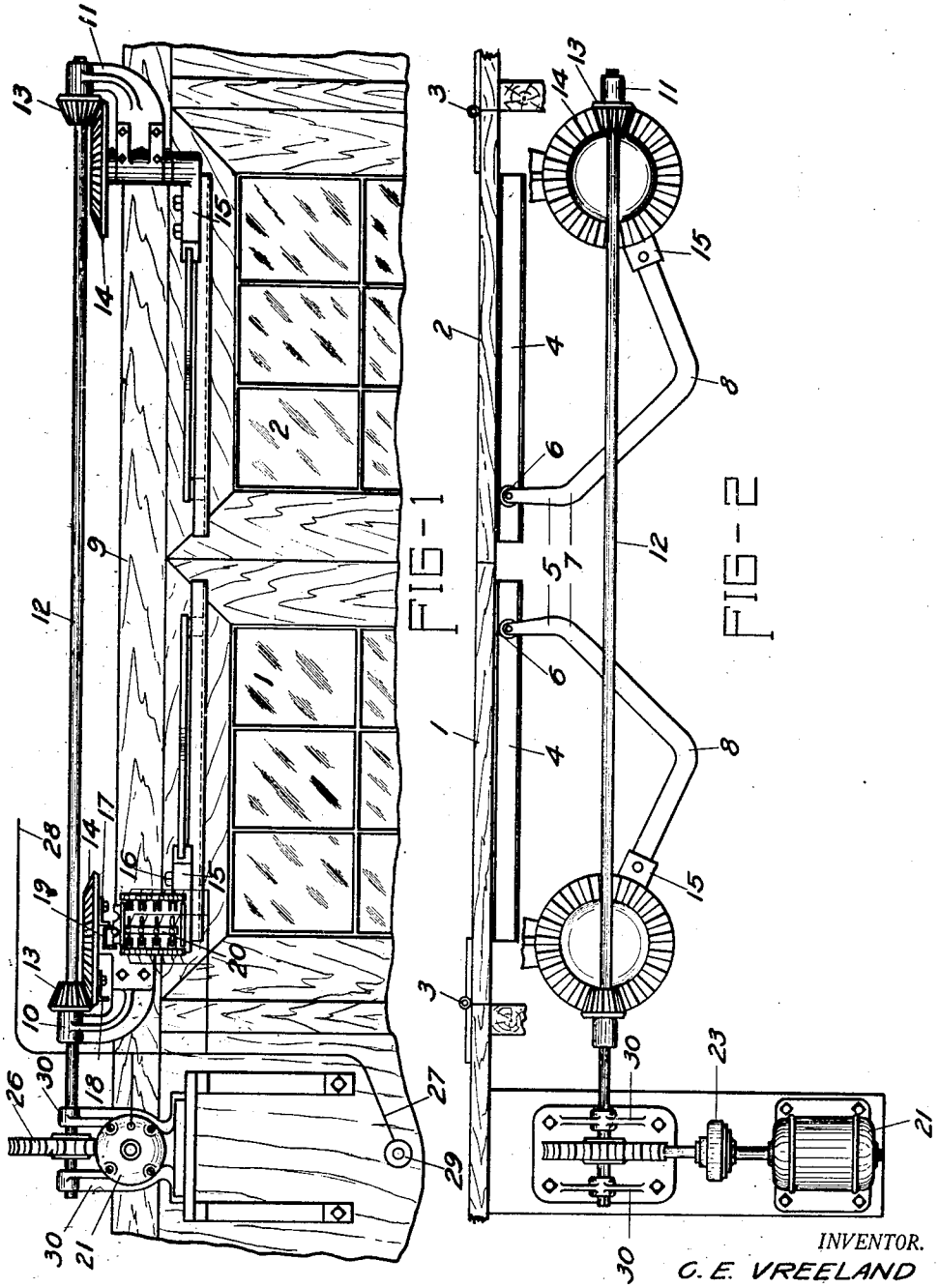


FIG-1

FIG-2

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Filed April 1, 1925 2 Sheets-Sheet 2

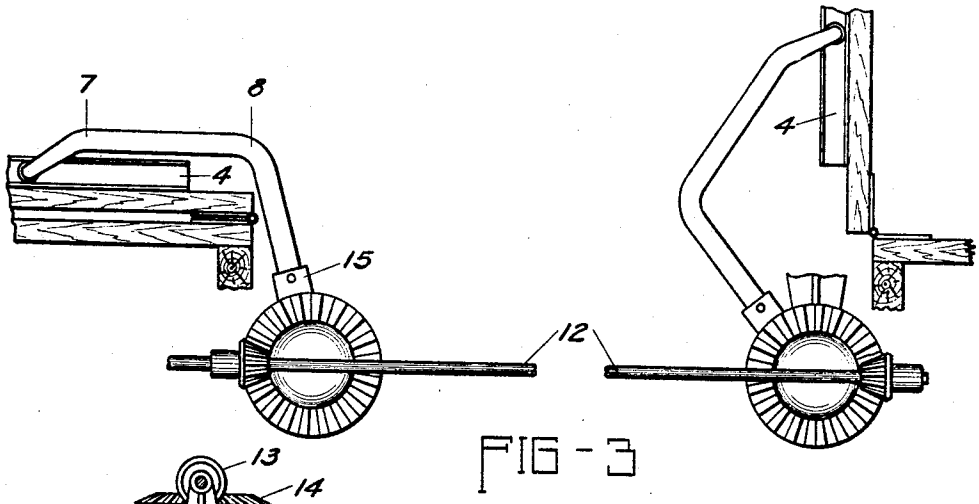


FIG-3

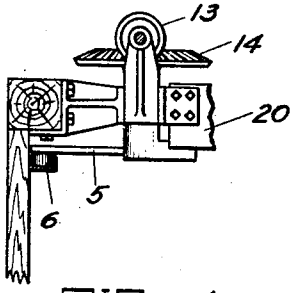


FIG-4

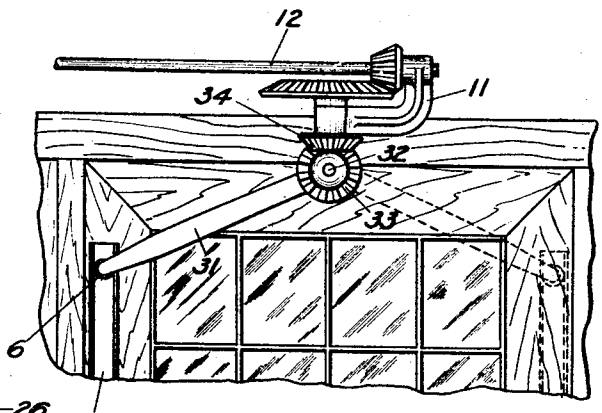


FIG-5

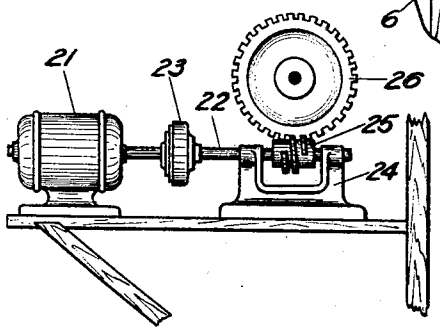


FIG-6

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UNITED STATES PATENT OFFICE.

CHARLES E. VREELAND, OF DAVENPORT, IOWA.

CLOSURE-OPERATING MECHANISM.

Application filed April 1, 1925. Serial No. 19,982.

My invention relates to control and operating mechanism such as finds its utility more especially in the opening and closing of doors, gates and the like, and among the objects of this invention are to provide an improved mechanism for accomplishing the stated functions; to provide apparatus by means of which the doors, gates or the like may be operated either from a near or a distant station; to provide means whereby a door, or the like, may be operated and which will hold the door or the like in any position of adjustment; to provide improved means of the character stated which is easily adaptable for either large or small closure members; to provide mechanism of the character stated which is capable of use with one type or another of closure means by a simple change in the operating mechanism; to provide mechanism of the character stated by means of which one door or the like may be moved at a different rate from a cooperating door or the like so that, even though the two may start from the same position, they will have different final positions to provide means whereby a door, gate, or the like, may be swung through any angle from zero degrees to 180 degrees and yet the operating means will have an abundance of power applied to the door to move or hold the same at any point in its course of travel; and such further objects, advantages and capabilities as will hereafter more fully appear and as are inherent in the structure herein disclosed.

My invention further resides in the combination, construction and arrangement of parts illustrated in the accompanying drawing, and while I have shown therein a preferred embodiment of my invention, I desire the same to be understood as illustrative only and not as limiting said invention.

Briefly stated, this invention comprises means connected to a door, gate, or the like for opening and closing the same, operating mechanism therefor adapted to actuate the door or the like, power means for governing the actuating means and near or remote control means for controlling the power means.

Referring to the drawings annexed hereto and forming a part hereof, Fig. 1 is a fragmentary elevation of a pair of doors having my invention applied thereto; Fig. 2 is a plan view of the mechanism shown in Fig. 1; Fig. 3 is a fragmentary plan view of the structure shown in Fig. 2 with one of the doors opened to full position and the other one to one-half opened position; Fig. 4 is a fragmentary transverse vertical section of Fig. 1 between the motor and the adjacent pair of operating gears; Fig. 5 is a fragmentary view of a portion of my invention showing its application in the movement of sliding doors and the like; and Fig. 6 is a fragmentary elevation showing the relationship of the operating motor and the worm drive connected therewith.

Referring more in detail to these drawings, numerals 1 and 2 denote a pair of swinging doors of ordinary type, the hinges thereof being shown at 3. Secured as closely adjacent the top of these doors as is convenient are channel shaped tracks 4, though means of other form might be substituted therefor to accomplish the same purpose. Cooperating with these tracks are arms 5 carrying at their outer ends rollers 6 the same being utilized to reduce to a minimum the amount of friction and wear which might otherwise occur at this point. It will be noted that the operating arms 5 are bent at 7 and 8, the purpose of this being clearly illustrated in Fig. 3 from which it is apparent that these bends are necessary in order to permit the door to be moved back against the side of the building.

The upper door casing member 9 carries a pair of brackets 10 and 11 in which is mounted the main drive shaft 12, carrying a pair of bevel gears 13 which cooperate with bevel gears 14 to drive the doors at a reduced speed. The gears 14 are mounted upon shafts which extend through the brackets 11 and carry at their lower extremities crank arms 15. Preferably these crank arms 15 have a socket in one face for the reception of an end of the arms 5 and have a cover plate secured thereto by suitable means, such as bolts 16 which hold the parts in properly assembled relation.

Carried by one of the bevel gears 14 are switch actuating members 17 and 18 which, during their travel, engage and operate an intermediate switch actuating element 19 which, in turn, actuates the movable element of a reversing switch 20. This latter controls the circuit through the motor 21 which is used to actuate the door opening mechanism. The motor is of the reversible type and therefore operates in either direction to drive the mechanism above described.

The shaft 22 of the motor 21 has a flexible

coupling 23 or a friction clutch or both coupling and clutch therein. This shaft 22 passes through a bracket 24 and carries a worm 25 whereby the worm gear 26 may be operated. This worm gear 26 is mounted on the shaft 12 and it will therefore be seen that when the motor is being operated the shaft 12 will be driven thereby. A pair of leads 27 and 28 go to near and remote control switches 29 by means of which the functioning of the motors may be controlled. The supporting means 30 may be separate from or integral with bracket 24, as desired.

In actual practice, the lead 28 extends to a post at the side of a driveway so that one may stop adjacent it and operate the switch thereon to cause the opening of the doors, or the like, without his alighting from his vehicle. He may then drive through the opening and operate a similar switch on the opposite side to close the opening through which he has just come. The switches 29 may be of any desired number and located wherever desired but should be of the double circuit type so that one or the other of two circuits extending thereto will be closed.

If desired one switch may be inside a garage on the wall next to the door. A second switch may be located at a distance of ten to twenty feet from the garage and a third switch may be located in a house. If used to operate a gate or pair of gates, the switches would be located at appropriate places and distances on both sides thereof so that they would be easy of access when approaching the gates. If it is desired to have one or more gates under the control of a person in a central office, suitable signal devices, such as switches connected with electric signaling circuits may be provided adjacent the doors or gates, these circuits including signaling means in the office. In this arrangement the motor switch would be located in the office so that the person in charge of the gate could actuate the switch for the opening of the gate. The mechanism described above is adaptable for use with either single or double swing doors, gates or the like, while that shown in Fig. 5 is adapted for use for sliding doors and the like, either single or double. In this form, the track 4, instead of being placed at the top of the door, is placed along the forward edge thereof and the arm 31, corresponding to arm 5 in the previously described structure, is straight and is rigidly attached to the outer end of a shaft 32 whose inner end carries a bevel gear 33 which meshes with a corresponding gear 34 which takes the place of socket member 15 in the structure previously described. It will be readily understood that the arm 31 will be made in various lengths to correspond to doors of different widths. It is obvious that if double doors are to be used and each is to slide one half the width of the door opening it will not be necessary to use as long an arm 31 as in case a single door is to be used which has to slide the full width of the door opening.

It is of course understood that the specific description of structure set forth above may be departed from without departing from the spirit of my invention as set forth in this specification and the appended claims.

Having now described my invention,

1. In apparatus of the character described, a reversible electric motor, a shaft rotated thereby, gears attached to the shaft and rotating therewith, gears driven by the aforesaid gears, shafts carrying the last named gears, arms operated by the last named shafts, tracks engaged and actuated by the arms, said tracks being connected to doors or the like, so that operation thereof will be caused by operation of the motor, a reversing switch for the motor, lugs on one of the last named gears adjacent the reversing switch and connecting the gear with the switch at predetermined positions for the stopping of the doors.

2. Operating mechanism for twin doors comprising a reversible motor, a shaft operatively connected thereto, gears carried by the shaft, gears adjacent the shaft and meshing with the first named gears, lugs carried by one of the last named gears, shafts upon which said last named gears are mounted, angular arms carried by said last mentioned shafts and adapted to engage said doors to open and close same, a reversing switch adjacent the gear carrying the lugs, and means carried by the switch and engaged by the lugs for operating the switch at predetermined times in the cycle of operation of the door.

In witness whereof, I hereunto subscribe my name to this specification.

CHARLES E. VREELAND.