F. O. HULT.

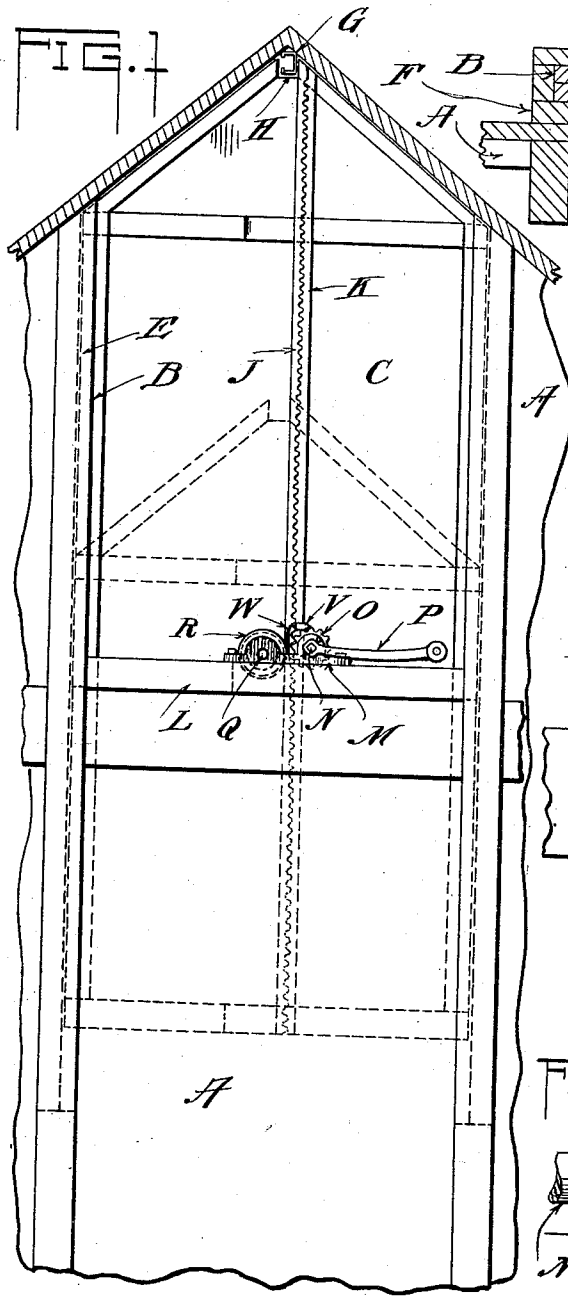
DOOR OPERATING MEANS.

APPLICATION FILED FEB. 28, 1913.

1,080,280.

Patented Dec. 2, 1913.

FIG. 1



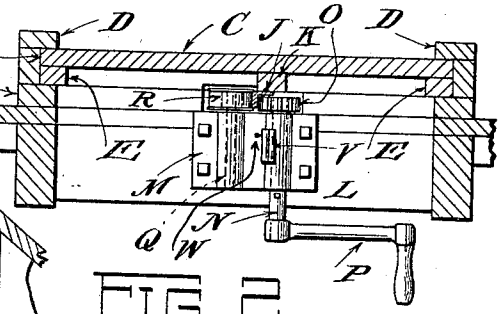




FIG. 2

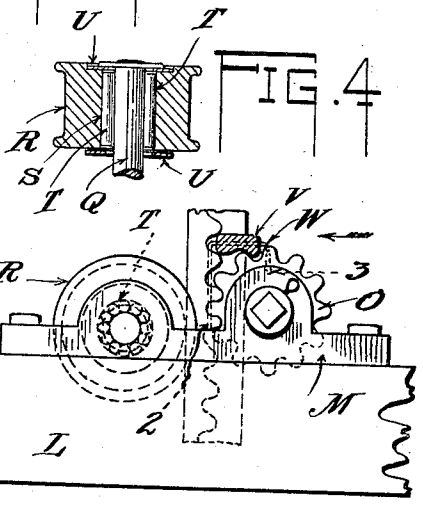



FIG. 4

FIG. 3

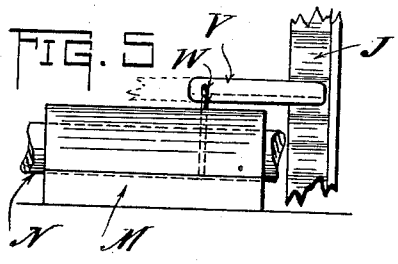



FIG. 5

WITNESSES

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# UNITED STATES PATENT OFFICE.

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## DOOR-OPERATING MEANS.

1,080,280. Specification of Letters Patent. Patented Dec. 2, 1913.

Application filed February 28, 1913 Serial No. 751,360.

*To all whom it may concern:*

Be it known that I, FRANK O. HULT, a citizen of the United States, residing at Galesburg, in the county of Knox and State of Illinois, have invented certain new and useful Improvements in Door-Operating Means; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a vertically movable door or window and means for raising and lowering the same and pertains to a door or window particularly adapted as a hay door for barns.

The invention consists of a door slidable in guideways and provided with a toothed rack with which a pinion engages by which the said door can be placed in a desired position, there being included a device to "chock" between a tooth of the pinion and the teeth of the rack for holding the door in a desired adjustment. Besides this, the invention includes certain details of construction such as will be pointed out in the following specification.

Figure 1 is an elevation of a portion of a building wall and a door opening showing my invention in connection therewith. Fig. 2 is a horizontal section of the door and operating means. Fig. 3 is an elevation of certain operating parts shown in Fig. 1. Fig. 4 is a longitudinal section of a grooved pressure roller. Fig. 5 is a side elevation of certain portions shown in Fig. 3 seen in the direction of the dart in that figure.

A indicates a part of the side wall of a building, B the door opening therein, and C a vertically movable door carried in vertically disposed guides formed by outer and inner strips D and E, Fig. 2, being part of the window frame indicated at F.

The door of my invention is particularly designed as a hay door for closing a door opening in the wall of the building through which opening hay can be passed, there being any usual hay track represented at G the top of the door having an opening H to admit said track when the door is raised and closed.

J is a rack-bar secured in suitable manner to a vertical projecting strip K of the door.

L is a cross sill carried by the window frame. Mounted on said sill is a casting M constituting a bearing for and carrying a shaft N provided with a pinion O in mesh with said rack-bar. Said shaft carries a crank P by which rotation is imparted to the pinion so that the door may be raised and lowered as required. In the casting M is secured in any suitable manner a stud Q, but said stud may be made with said casting, if desired, said stud extending in the direction of the door and carrying a roller R, Fig. 4. Said roller is provided with a bore S considerably larger in diameter than the diameter of the stud Q and a series of rollers T lies within the bore entirely filling the space around and bearing upon the stud, there being suitable end members U carried by the roller R to prevent the rollers T from slipping outward endwise.

V is a latch mounted on an inverted L-shaped bail, its ends being suitably secured to the casting M substantially in the positions shown at 2 and 3 in Fig. 3, the said latch being carried on the horizontal limb of said bail. When lying in a horizontal position shown in Figs. 3 and 5 the free end of the latch will lie upon the pinion O receiving one of the teeth of the same against it, the opposite edge of the latch lying between two of the teeth of the rack-bar K.

The roller R receives the pressure of the rack-bar laterally against it and thus holds said bar firmly in mesh with the pinion. The tendency of the pinion is to rotate due to the weight of the door resting upon its teeth through the rack-bar, and, in order that the rack-bar cannot slip by, the roller or its equivalent is provided. Since the latch receives the thrust of the pinion in a lateral direction from the tooth against the rack-bar, said roller R takes the resulting side thrust.

In operation the latch when disengaged by being lifted and drawn back, as shown in Fig. 2, and in broken lines in Fig. 5, permits the pinion to be rotated and the door to be raised and lowered. The crank arm P is of good length so that the weight of said door may be sustained with ease and so, also, that it can be adjusted very readily to any required opening after which the latch can be thrown between the pinion and the rack-bar constituting an absolute lock for the same by chocking between them.

Doors of this nature or for this purpose are extremely heavy and bulky and they are

dangerous to handle for this reason the means usually provided for operating them being very crude and unreliable. For this reason I have devised a device herein by which a door of any size and weight can be readily handled. The latch V is of especial advantage in that it is absolutely a safety appliance since it readily chocks between the pinion and rack-bar and cannot slip or jump out of place, whereas the latch of the type which merely engages a ratchet tooth in the ordinary manner is not safe and very unreliable. The provision of the rollers T admits of the free revolution of the roller R. Since there is considerable pressure against the roller it is required that it rotate very easily so that there will be no sliding relation between it and the rack-bar otherwise a flat face would likely be the result and the free operation of the device would be wanting.

Having thus described my invention, I claim:—

1. The combination of a door adapted for vertical movement, a rack-bar secured thereon in a vertical position, a pinion engaging the rack-bar, means for rotating the same, a member opposite the pinion and having the rack-bar between it and said pinion and adapted for receiving pressure from the former, and a latch adapted to lie between the pinion and rack-bar and in engagement with both.

2. The combination of a door adapted for a vertical movement, a rack-bar secured thereon and having a vertical position, a pinion engaging the rack-bar, means for rotating the same, a pressure roller opposite the pinion and having the rack-bar between it and said pinion and adapted for receiving pressure from the former, and a latch adapted to lie between the pinion and rack-bar and in engagement with both.

3. The combination of a door adapted for a vertical movement, a rack-bar secured thereon and having a vertical position, a pinion engaging the rack-bar, means for rotating the same, a pressure roller opposite the pinion, a stud to carry it, and a series of friction members in said roller in contact with it and the said stud, the rack-bar lying between the roller and said pinion, the roller adapted to receive pressure from the rack-bar, and a latch adapted to engage between the pinion and said rack-bar.

In testimony whereof I affix my signature, in presence of two witnesses.

FRANK O. HULT.

Witnesses:
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L. O. EAGLETON.

**Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."**