

UNITED STATES PATENT OFFICE.

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TRAP-DOOR OPENER.

SPECIFICATION forming part of Letters Patent No. 762,741, dated June 14, 1904.

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To all whom it may concern:

Be it known that I, CHRISTIAN HANSEN MOOS, a citizen of the United States, and a resident of Stillwater, in the county of Washington and State of Minnesota, have invented a new and Improved Trap-Door Opener, of which the following is a full, clear, and exact description.

This invention relates to means for automatically opening a heavy trap-door that guards an opening in a floor, and has for its object to provide novel features of construction for a trap-door opener that are extremely simple, practical, and inexpensive, take up but little room, do not obstruct the door-opening, afford means for counterbalancing doors of different weight that are provided with the improvement, and also permit the graduation of the lifting power, so that the door will remain closed until started to open by a slight manual effort.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claim.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a transverse sectional view of a floor at a door-opening, a vertical wall adjacent to the door-opening, a longitudinal sectional view of a trap-door hinged to adapt it to open or close the door-opening, and a side view of the improved door-closing device connected with the floor-timbers and with the door, holding the latter in closed condition. Fig. 2 is a similar view to Fig. 1, but showing the door open and held in a vertical position; and Fig. 3 is a front view of the door-closer and of the door held opened thereby seen in direction of the arrow *x* in Fig. 2.

In the drawings, 5 represents sectionally a floor in part supported horizontally by the joists 6.

7 is a door-opening; 8, a vertical wall or partition erected upon the floor 5 near one side edge *a* of the opening 7.

9 is a trap-door adapted to fill the opening 7, and 10 indicates hinges secured upon the

floor and the upper side of the door at the side edge *a* of the door-opening, thus adapting a rocking movement of the door to open or close said door-opening, the complete depression of the door serving to fill the opening 7 and dispose the door in the same plane with the floor 5.

The improved door-opening device comprises the following details: A metal bar is bent or formed to produce an angular corner at *b* and afford two arms 11 12, disposed substantially at right angles to each other. A bracket-plate 13 is secured upon the floor or a joist 6 below and near the hinged edge of the door 9, said plate supporting by a pivot at its lower end the angularly-diverged arms 11 12 at their corner *b*, whereby the arm 12 may assume an upright position near the door 9 when said door is in opened adjustment.

The bracket-plate 13 and arm 12, held to rock thereon, are placed near the transverse center of the opening 7 and the door 9. Upon the free end of the arm 12 a roller *c* is pivoted, and upon the free end of the arm 11 a hook *d* is preferably formed.

On the side of the door 9 which is lowermost when the door is closed a wear-plate 14 is secured, that extends from the hinged edge of the door toward the opposite edge. The wear-plate 14 is located at the transverse center of the door 9, so that the roller *c* may contact therewith, and obviously the roller will traverse the wear-plate longitudinally if held in contact therewith and the door is rocked upon its hinges.

A weight 15 of sufficient heft to nearly counterbalance the weight of the door 9 is furnished and is hung from a link-rod 16, whereon a hook *e* is formed, that engages the hook *d*, or the hook *e* may be closed to produce an eye, if this is preferred.

Upon the upper side of the trap-door 9, near the edge opposite the one engaged by the hinges 10, a ring *g* or like grip-piece is loosely secured for convenient manipulation.

As before mentioned, the weight-block 15, which may be exchangeable, is of such heft that it nearly counterbalances the gravity of the door 9 or such a proportion of its weight as would ordinarily have to be lifted manu-

ally, so that when the door is closed it will remain so adjusted until it is desired to raise it and remove it from the opening 7.

At any time when it is necessary to open 5 the trap-door 9 the ring *g* is taken hold of and a slight lifting pull is applied thereto, which will start the rocking movement of the door upwardly and enable the gravity of the weight-block 15 to pull the arm 11 downward 10 and the arm 12 upward, thus pressing the roller *c* against the wear-plate 14, over which said roller travels. The door 9 is thus automatically opened and when rocked into a vertical position may be arrested from rocking 15 further toward the partition 8 by the abutment *h*, that may be formed or secured on the wall 8 for contact with the door.

It will be seen that the device may be applied upon trap-doors having different weight 20 and area, as the weight-block 15 may be exchanged for one of proper heft to suit the gravity of the door, so that the improvement may be generally applied for counteracting the gravity of a hinged trap-door and automatically raising said door after it has been 25 started by a slight pull.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

A trap-door opener, comprising a substantially flat bar, bent near its longitudinal center, producing two arms that diverge essentially at a right angle from each other and are disposed in the same vertical plane in service, a bracket-plate depending from a floor-joint near the trap-opening in the floor, a 35 hinged door which when closed will fill the opening, a pivot-support for the integral arms which holds them free to rock on the bracket-plate at the junction of said arms, a roller on one arm which makes contact with 40 a wear-plate on the normally lower side of the door, a link-rod hooked upon the free end of the other arm, a weight on the rod that nearly counterbalances the weight of the door when it is closed, means for raising the door 45 manually to give it an upward impulse, and an abutment whereon the door will have contact when it is fully opened.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses. 50

CHRISTIAN HANSEN MOOS.

Witnesses:

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FRED S. FOSTER.