(No Model.)

A. RALPH.

HATCHWAY.

No. 321,638. Patented July 7, 1885.

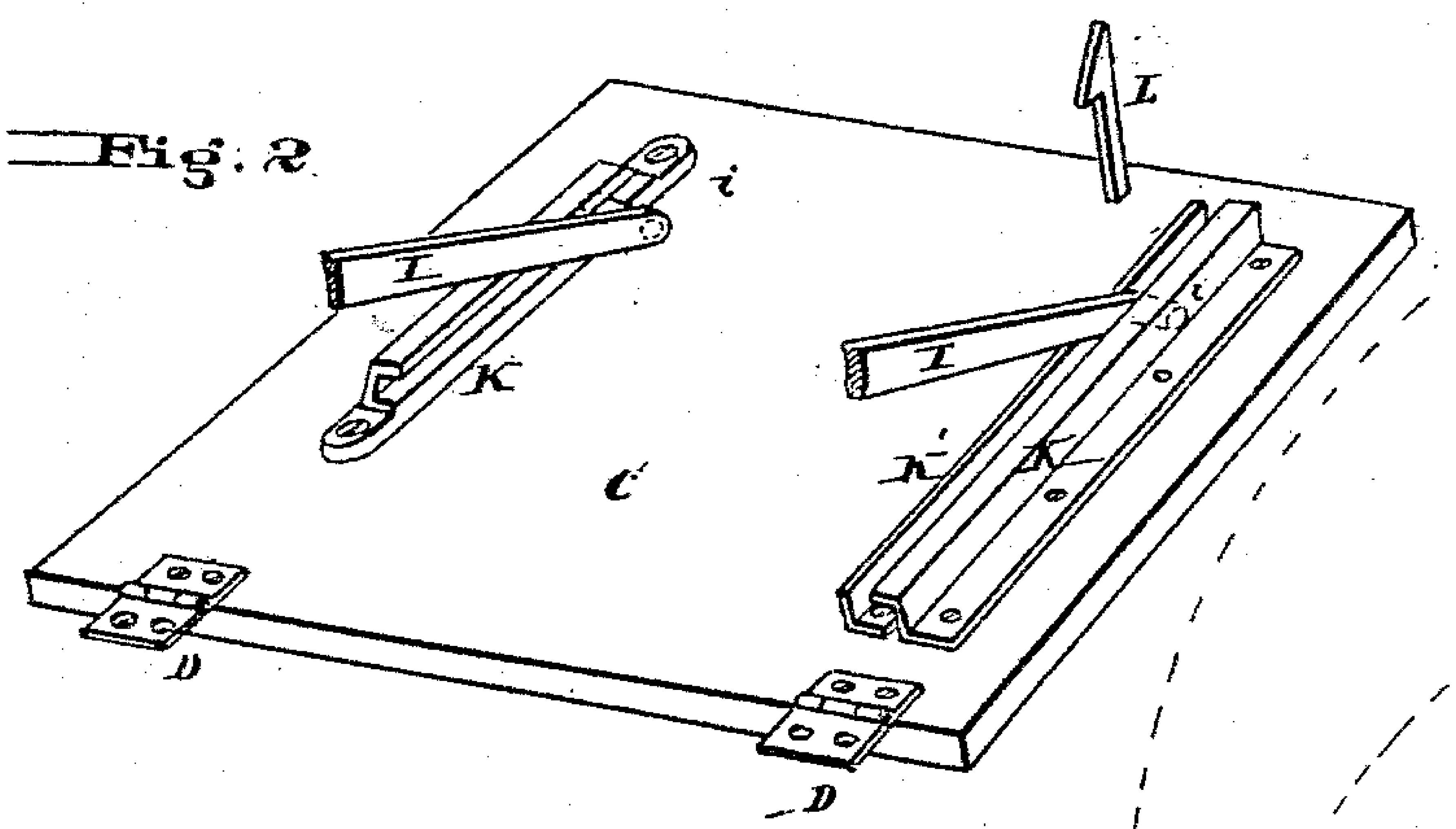

Fig. 2

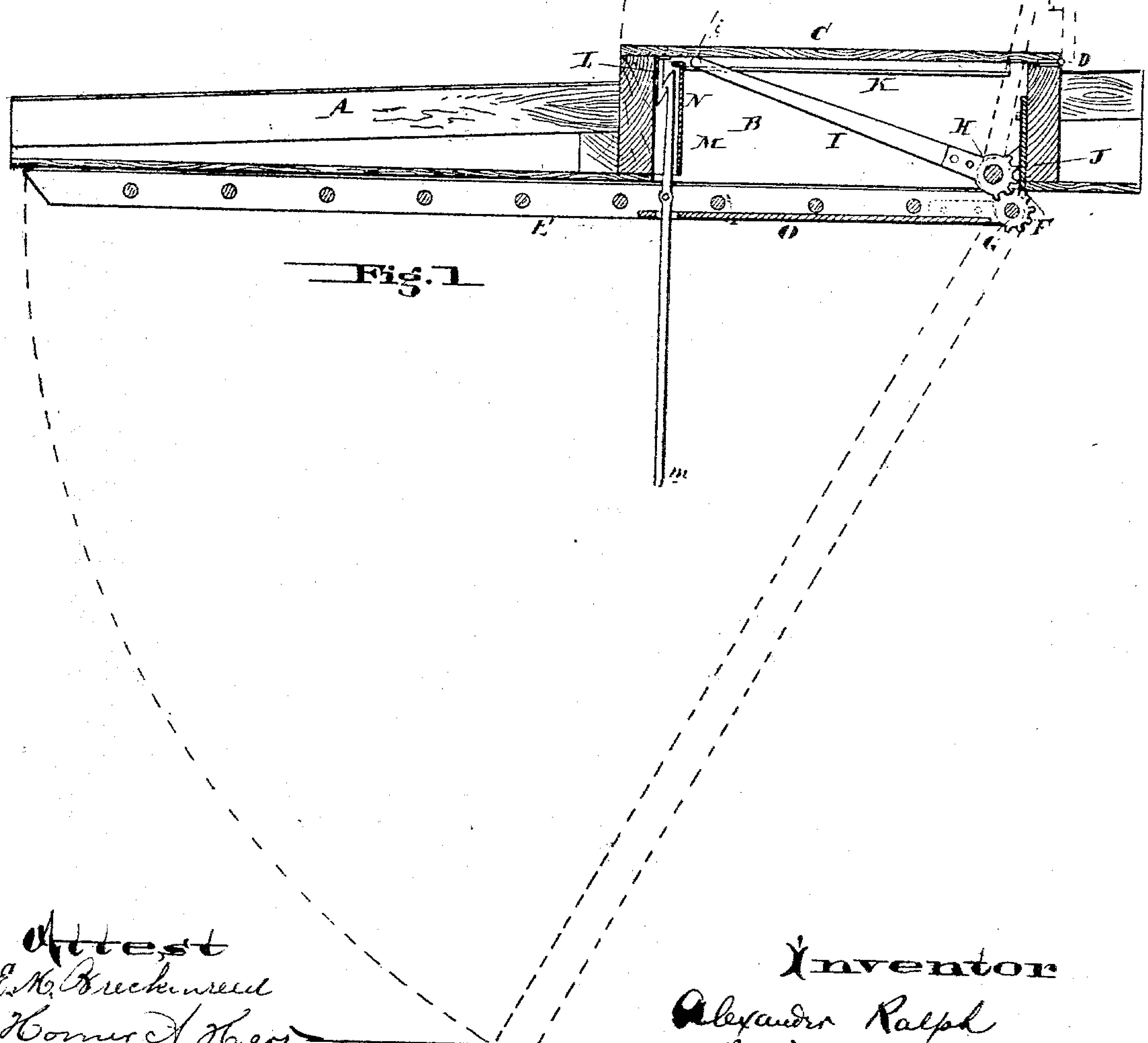

Fig. 1

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E. M. Breckinreed
Homer A. Herr.

Inventor
Alexander Ralph
By his atty.

BELL BROS., PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ALEXANDER RALPH, OF PHILADELPHIA, PENNSYLVANIA.

HATCHWAY.

SPECIFICATION forming part of Letters Patent No. 321,638, dated July 7, 1885.

Application filed April 6, 1885. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER RALPH, of the city and county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Hatchways, of which the following is a specification.

My invention has reference to combined hatchways and ladders especially adapted for houses; and it consists in certain improvements fully set forth in the following specification, and shown in the accompanying drawings, which form part thereof.

In my construction I hinge one end of the ladder to the ceiling or one edge of the trap-door passage-way and provide it with a gear-segment adapted to mesh with a similar segment on the end of one or more pivoted arms or levers arranged to raise or lower the hinged trap-door, they exerting the greatest power when the door is down and the least when raised, being proportional to the amount of work to be accomplished. My object is, further, to provide the lever with a closed portion, which, when the said ladder is raised and locked, the said closed portion closes the opening on the lower side of the trap-passage-way, thus forming, with the trap-door, two sealed obstructions to an entrance into the house. Further, I provide a suitable lock carried by the ladder, which, when raised, engages with the hinged trap-door, thus securely locking both the ladder and the lower closed portion of the said ladder securely in position, as well as securing the trap-door itself.

In the drawings, Figure 1 is a sectional elevation of my improved trap-door and ladder shown in closed positions, with the opened positions indicated in dotted lines; and Fig. 2 is a perspective view of the trap-door in an inverted position.

A is the roof. B is the trap-door passage-way. C is the hinged trap-door, and D is the hinge thereof.

E is the ladder, and is hinged at F to the ceiling or one edge of the passage-way B. Secured at its hinged end is the gear-segment G, which engages with the segment J on the arm or lever I, pivoted at H, the free end of which lever is bent over, as at *i*, and is adapted to work under the guide-iron K, secured to the trap-door, and, if desired, may be retained in the groove formed thereby by means of the angle-iron K'. (See Fig. 2.) In place of the two angle-irons, a solid casting provided with a groove or slot may be secured to the trap-door, and a pin carried by lever I works in said slot, as indicated on the left-hand side of Fig. 2. From this it is seen that if the ladder E be drawn down to the position indicated in dotted lines the lever I will be raised to the position indicated also in dotted lines, the end *i* sliding in the groove formed by the iron K, and thereby raising the door with it. It is also evident that when the ladder is first lowered, and its leverage is greatest, the power required to raise the trap-door is also greatest. In addition thereto, the lever I at this point operates upon the trap-door farthest from its hinged point, and gradually decreases its leverage as the trap-door is raised and as the work to be accomplished becomes lessened. The construction shown also enables the lever I to be adjusted to suit trap-door passage-ways of greater or less depth, which adjustment is easily made by setting the lever I at the desired angle and placing it in gear with the segment G, or simply lengthening the lever I itself, which may be made of wood or metal. The hinged trap-door is provided with a catch, L, which engages with a locking-lever, M, pivoted to the ladder E, and having its lower arm, *m*, extending down to within reach from the floor. When the trap-door is closed, the lever M locks it in position, and simultaneously therewith locks the ladder in its raised position, directly through the said lever M and indirectly through the gear-connection of the lever with the trap-door.

N is a metallic case to inclose the locking mechanism, by which it may not be tampered with if a hole should be previously bored into the trap-door.

O is a closed portion secured to the lower edge of the ladder, and so located that when the ladder is raised it closes the lower opening to the trap-door passage-way, thus offering an additional obstruction to an entrance from without. If desired, this closed part or partition O may be made of metal or wood, or of the latter sheathed with metal.

Two levers, I, are shown, and may be used,

though one will suffice; but increased strength would result from the use of two. This lever and the ladder may be hinged to a single plate bolted or otherwise secured to the side of the passage-way, whereby the parts are held firmly in position.

While I prefer the construction shown, the minor details may be modified in various ways without departing from my invention.

I am aware that it has been proposed to provide hinged or pivoted gate-bars provided with gear or segments which, by the action of the ascending or descending cage, are caused to mesh with racks thereon, raising or lowering the said gate-bars, as set forth in Patent No. 303,388, and I therefore do not claim the broad application of gearing to raise or lower one part adapted to be operated by a movement of another part.

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

1. A trap-door and its passage-way, combined with a hinged ladder or steps adapted to be raised or lowered to connect the trap-door passage-way with the floor, the said ladder or steps being provided with a solid or closed portion, which, when said ladder is raised, offers an obstruction to passage to the lower part of said passage-way, substantially as and for the purpose specified.

2. A trap-door and its passage-way, combined with a hinged ladder or steps adapted to be raised or lowered to connect the trap-door passage-way with the floor, the said ladder or steps being provided with a solid or closed portion, which, when said ladder is raised, offers an obstruction to passage to the lower part of said passage-way, and a lock to secure said ladder or steps in its raised position, substantially as and for the purpose specified.

3. A trap door and its passage-way, combined with a hinged ladder or steps adapted to be raised or lowered to connect the trap-door passage-way with the floor, the said ladder or steps being provided with a solid or closed portion, which, when said ladder is raised, offers an obstruction to passage to the lower part of said passage-way, and lever mechanism connecting said trap-door and ladder, so that when the ladder is lowered the trap-door is raised, and vice versa, substantially as and for the purpose specified.

4. A trap-door and its passage-way, combined with a hinged ladder or steps adapted to be raised or lowered to connect the trap-door passage-way with the floor, the said ladder or steps being provided with a solid or closed portion, which, when said ladder is raised, offers an obstruction to passage to the lower part of said passage-way, lever mechanism connecting said trap-door and ladder, so that when the ladder is lowered the trap-door is raised, and vice versa, and a lock to simultaneously lock the trap-door when closed and ladder when raised, substantially as and for the purpose specified.

5. A trap-door, in combination with a hinged ladder, arranged substantially as set forth, and a lock to simultaneously lock said trap-door when closed and ladder when raised, substantially as and for the purpose specified.

6. A trap-door, in combination with a hinged ladder, arranged substantially as set forth, and a locking-lever carried by the ladder to simultaneously lock said trap-door when closed and ladder when raised, substantially as and for the purpose specified.

7. A trap-door, in combination with a hinged ladder, arranged substantially as set forth, and a lock to simultaneously lock said trap-door when closed and ladder when raised, and a metal casing located between the trap-door and ladder to protect the locking devices, substantially as and for the purpose specified.

8. A trap-door and its passage-way, in combination with a hinged ladder, gear, and lever mechanism, substantially as described. connecting said trap-door with said ladder, by which the ladder is lowered, the trap-door is raised, and vice versa, substantially as and for the purpose specified.

9. The combination of door C, passage-way B, hinged ladder E, having gear-segment G, and lever I, having segment J, substantially as and for the purpose specified.

10. The combination of door C, passage-way B, hinged ladder E, having gear-segment G, lever I, having segment J and ends or pins *i*, and guide K, substantially as and for the purpose specified.

11. The combination of door C, having catch L, hinged ladder E, and locking-lever M, carried by the ladder, substantially as and for the purpose specified.

12. The combination of a hinged trap-door with a hinged ladder, the raising or lowering of which lowers or raises the trap-door, lever mechanism, substantially as set forth, by which the movement of the ladder operates the trap-door, and guide-irons having a longitudinal groove or slot secured to said trap-door, and in which the free end of the lever works, substantially as and for the purpose specified.

In testimony of which invention I hereunto set my hand.

ALEXANDER RALPH.

Witnesses:
R. M. HUNTER,
FRANCIS S. BROWN.