O. L. LINK.

TRAP DOOR.

APPLICATION FILED MAY 18, 1912.

1,122,514.

Patented Dec. 29, 1914.

3 SHEETS—SHEET 1.

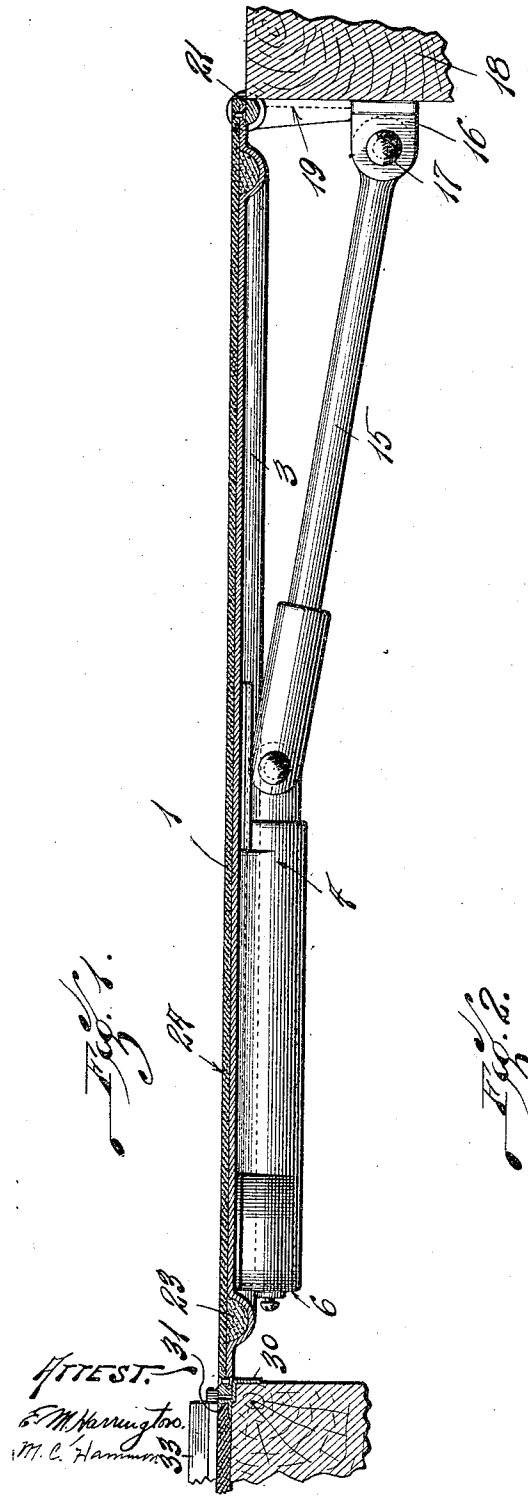


Fig. 1.

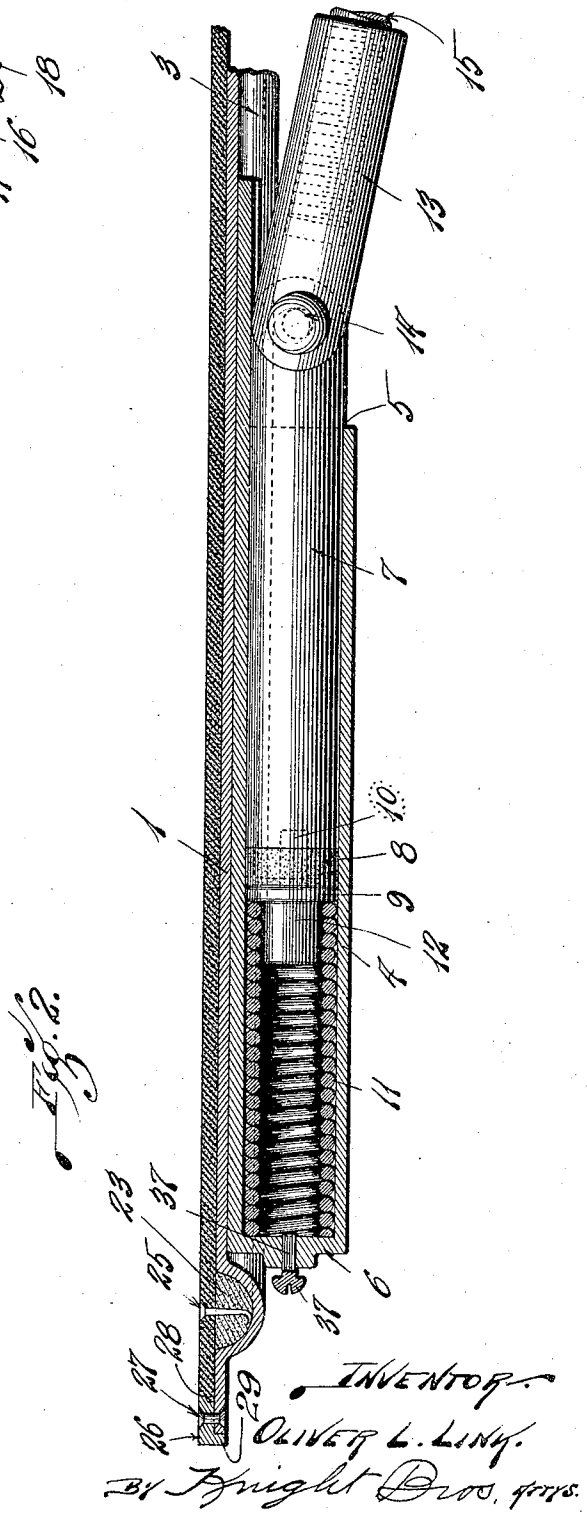


Fig. 2.

WITNESSES:

E. M. Harrington.

M. C. Hammond.

INVENTOR:

Oliver L. Link.

By Bright Bros. Attys.

O. L. LINK.

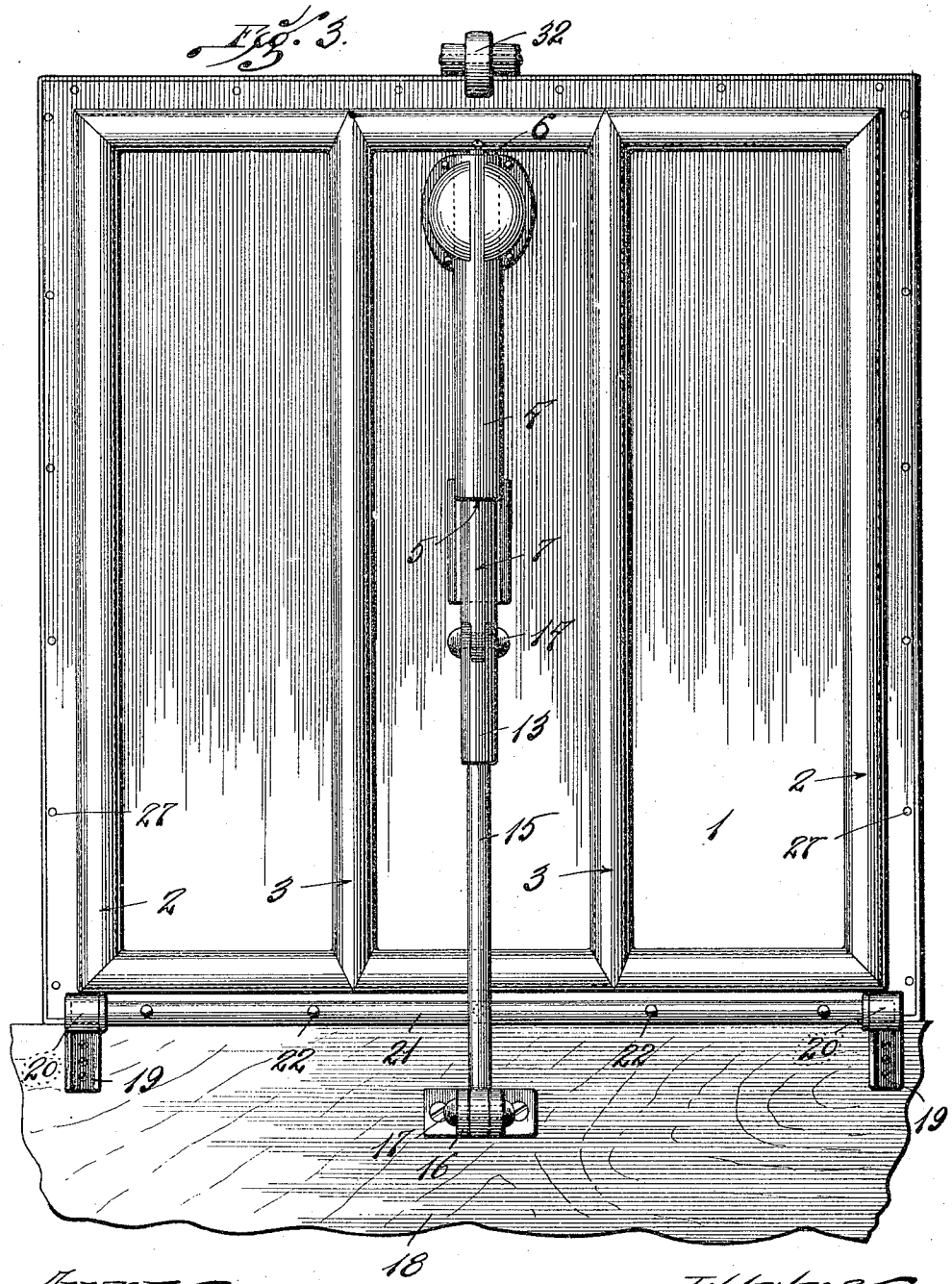
TRAP DOOR.

APPLICATION FILED MAY 18, 1912.

1,122,514. Patented Dec. 29, 1914.

3 SHEETS—SHEET 2.

Fig. 3.



Attest.
E. M. Warrington.
M. C. Hammon.

Inventor.
Oliver L. Link.
By Knight Bros. Attys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

O. L. LINK.

TRAP DOOR.

APPLICATION FILED MAY 18, 1912.

1,122,514. **Patented Dec. 29, 1914.**

3 SHEETS—SHEET 3.

Fig. 4.

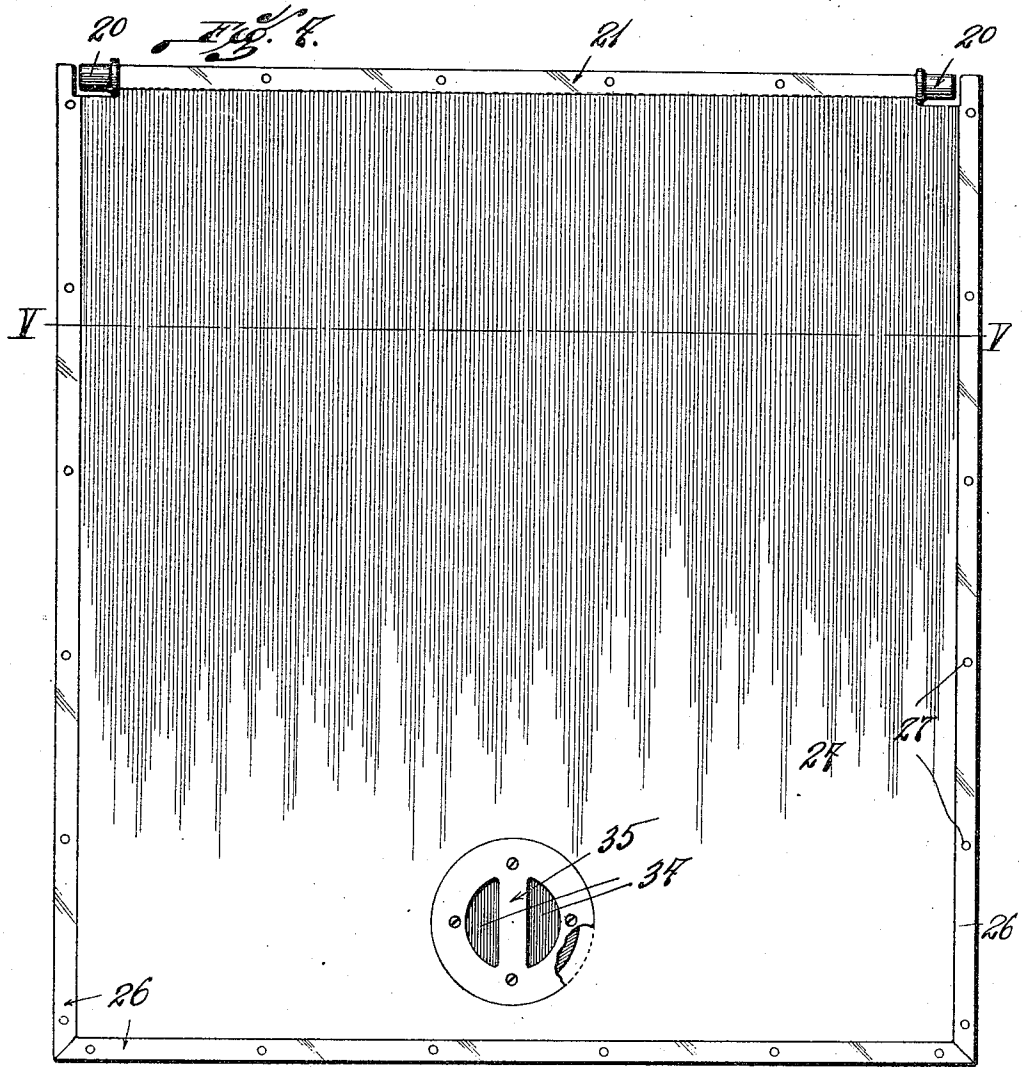


Fig. 6.

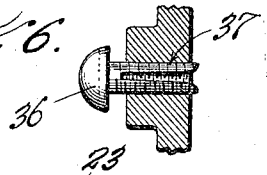
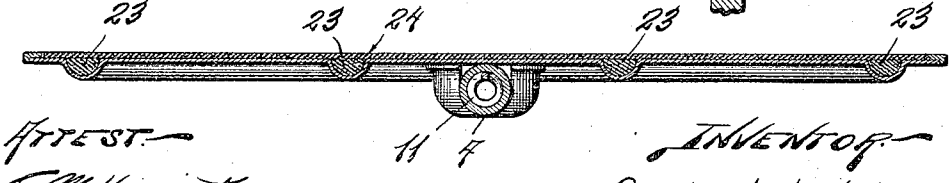


Fig. 5.



ATTEST.

E. M. Warrington.

M. C. Hammon.

INVENTOR.

OLIVER L. LINK.

By Wright Brothers

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

OLIVER L. LINK, OF ST. CHARLES, MISSOURI.

TRAP-DOOR.

1,122,514. Specification of Letters Patent. Patented Dec. 29, 1914.

Application filed May 18, 1912. Serial No. 698,124.

To all whom it may concern:

Be it known that I, OLIVER L. LINK, a citizen of the United States of America, residing in St. Charles, in the county of St. Charles and State of Missouri, have invented certain new and useful Improvements in Trap-Doors, of which the following is a specification.

This invention relates to trap doors, and is more especially designed for use on vestibule platforms of passenger coaches.

The primary object of this invention is to construct a trap door forming part of a vestibule platform and having mechanically operated means for opening said trap door and disclosing the steps.

Another object of this invention is to provide means whereby the door is opened slowly.

Another object is to provide means whereby, when the trap door is opened, the operating means lie close against the under side of the door so as not to obstruct the step passageway.

Other and further objects will appear in the specification, and be specifically pointed out in the appended claims, reference being had to the drawings exemplifying the invention, and in which,

Figure 1 is a cross section through this improved trap door and a part of the platform. Fig. 2 is an enlarged section through a portion of the center of the door, showing the operating means. Fig. 3 is a side elevation of the trap door when in opened position. Fig. 4 is a plan view of the trap door. Fig. 5 is a cross section on the line V—V, Fig. 4. Fig. 6 is an enlarged section showing air inlet means to the working cylinder.

Referring to the drawings: 1 designates the trap door, which is made preferably of sheet metal, having reinforcing grooves 2, said reinforcing grooves being adjacent the edge of the door. Said door has further reinforcing grooves 3 adjacent the central portion of the door and running parallel with the reinforcing grooves 2 which are adjacent the side edges of the door, and intersecting with the reinforcing grooves adjacent the front and rear edges of the door.

Mounted on the under side of the door, and in the center thereof, and adjacent the front edge of the door is a cylinder 4 having one end open, as at 5, the other end being closed by the cylinder end or head 6.

Mounted in the cylinder 4 is a plunger rod 7, carrying a cup washer 8 at its forward end, said washer being held in place by the follower 9. Said follower 9 has a threaded portion 10 threads not shown which is screwed into the forward end of the plunger 7, thus holding the cup washer 8 in place. Mounted in the forward end of the cylinder 4, is a compression spring 11, one end of said spring bearing against the cylinder head 6, and the other end bearing against the follower 9 of the plunger 7, said follower 9 having an extended portion 12 upon which the spring is seated.

Mounted on the plunger rod 7, and at the opposite end to which the cup washer 8 is mounted on said plunger, is a socket 13, said socket 13 being swingingly mounted on said plunger by the bolt or pintle 14. One end of this socket 13 is threaded interiorly, said threading receiving the connecting rod 15. Said connecting rod 15 has its opposite end swingingly mounted on the bracket 16 by the bolt or pintle 17. Said bracket 16 is mounted on the sill 18 of the car.

Mounted on the sill 18 and adjacent the under side and rear of the trap door, are the hinge members 19. Said hinge members engage the ends 20 of the hinge rod 21, said hinge rod being fastened to the under side of the door by the rivets 22.

In providing improved means for fastening the flooring or tiling to the door, the grooves 2 and 3, forming reinforcings for the door, are filled with a plastic material, such as asphaltum, said material adhering in the grooves, as shown at 23. The tiling 24 is then laid on the door, said tiling being held down by nails or brads 25 which are driven through the tiling and through the plastic material. The edges of the tiling adjacent the edges of the door are held in place by the L-shaped metallic strips 26, being fastened to the door by the rivets 27. Said strips, when laid, form a recess 28 in which the edge of the tiling is inserted. Said metallic strips 26 have a depending edge 29 which depends over and covers the edges of the door 1, thus forming an improved finishing strip.

To form an abutting resting strip for the under side front and side edges of the door, when closed, an angular strip 30 is fitted around the door opening frame, said strip 30 also forming a retaining strip for the edge of the tiling of the vestibule floor, said

tiling edging being inserted in the recess 31 of the retaining strip 30. The door, when opened (as shown in Fig. 3) is held against closing by the gravity latch 32; and when closed, is held down by the lock 33.

In order to provide means for manually opening the trap door in case the mechanically operating elements become out of order, the ordinary finger hold 34 is provided, said finger hold 34 having the finger or hand grip member 35.

Located in the cylinder head 6 of the cylinder 4, is a split screw 36, mounted in the threaded opening 37. This split screw forms air regulating means for the cylinder 4.

The operation of this improved trap door is as follows. When closed (as shown in Fig. 1) and it is desired to open it, some one in authority will unlock the lock 33. Then the spring 11, which is under its greatest compression, will begin to expand. By reason of one end of the spring bearing against the cylinder head 6 and the other end against the follower 9 and plunger 7, the expansion of said spring will be against the cylinder head 6. By reason of the connection between the connecting rod 15 and the plunger 7 and bracket 16, the door will begin to rise. This rising will be gradual and not with a rush or quick opening. Said gradual rising of the door being attained by reason of the cylinder 4 being moved from the plunger 7. The cup washer 8 pressing against the walls of the cylinder, a vacuum will be formed in said cylinder. The split screw 36 is mounted in the cylinder head 6, forming the regulating means for permitting air to flow into the cylinder, thus completing the improvement for allowing the door to be opened slowly, owing to the air regulating provided by the longitudinal split formed in said screw. In closing the door, the gravity catch 32 will be lifted, and the door pressed down into place, again forming part of the vestibule floor. It is held in place by a turning of the lock 33.

This improvement, by having the door open slowly is a perfect protection to the operator or by-standers from injury, as if the door opened with a rush, and the operator or by-stander happened to be standing over the path of travel of the edges of the door, an injury would be likely to occur. The manner in which the connecting rod 15 is secured to the socket 13 affords means for adjusting the plunger by the turning of said socket or plunger. When this improved trap door is opened, the operating means will lie vertically against the under side of the door, thus leaving no parts or mechanism to obstruct the step passageway. If it is desired to construct a large and heavy trap door, two or more of these improved operating devices can be used.

What I claim is:

1. The combination of a trap door, with a cylinder mounted on the under side of said door, said cylinder being slidably mounted on a plunger, said cylinder being spring actuated from said plunger.

2. The combination of a door, with a cylinder mounted on said door, a plunger mounted in said cylinder said plunger holding a spring against the end of said cylinder causing said cylinder to slide on said plunger.

3. The combination of a hinged door with a cylinder, said cylinder being mounted on said door, said cylinder having a spring and a plunger mounted therein, said plunger being connected to a connecting rod, said connecting rod being out of alinement with said cylinder and plunger when said door is closed.

4. The combination of a hinged door with a cylinder, said cylinder being mounted on said door, said cylinder having a spring and a plunger mounted therein, said plunger being connected to a connecting rod, said connecting rod being out of alinement with said cylinder and plunger when said door is closed, the combination of said cylinder, spring, and plunger, and the relation of the connecting rod thereto, forming the door opening means.

5. The combination of a trap door, with a cylinder mounted on the under side of said door, said cylinder being slidably mounted on a plunger, said cylinder being spring-actuated from said plunger, and means whereby said door is opened gradually.

6. The combination of a door, with a cylinder mounted on said door, a plunger mounted in said cylinder a spring mounted in said cylinder, said plunger holding said spring against the end of said cylinder causing said cylinder to slide on said plunger, and means whereby said door is opened gradually.

7. The combination of a hinged trap door forming part of a floor, a cylinder mounted on the under side of said door, said cylinder being slidably mounted on a plunger, said cylinder being spring-actuated from said plunger, said plunger forming a vacuum in said cylinder, and regulating means for regulating said vacuum and said cylinder.

8. The combination of a hinged trap door forming part of a floor, a cylinder mounted on the under side of said door, said cylinder being slidably mounted on a plunger, said plunger carrying a packing element thereon, said cylinder being spring-actuated from said plunger, said plunger forming a vacuum in said cylinder, and regulating means for regulating said vacuum and said cylinder.

9. The combination of a door, and a cylinder mounted on said door, a plunger

mounted in said cylinder, a spring mounted in said cylinder, said plunger holding said spring against the end of said cylinder causing said cylinder to slide on said plunger, said cylinder creating a vacuum when sliding on said plunger.

10. The combination of a hinged trap door, a cylinder mounted on the under side of said door, said cylinder being slidably mounted on the plunger, a spring located in said cylinder and interposed between the head of said cylinder and said plunger, a connecting rod swingingly connected to one end of said plunger, said connecting rod being swingingly connected at its other end adjacent the under side of said door, and vacuum reducing means located at one end of said cylinder.

11. The combination of a trap door, with a cylinder carried by said door, said cylinder being slidably mounted on a plunger, said cylinder being spring actuated from said plunger, and means located adjacent said cylinder for preventing a too rapid expension of said spring.

12. In a door operating mechanism, a door, a cylinder carried by said door, a plunger mounted in said cylinder, a resilient member located in said cylinder between said plunger and one end of said cylinder, said resilient member adapted to slide said cylinder on said plunger to move said door.

13. In a door, operating mechanism, a door, a cylinder carried by said door, a plunger mounted in said cylinder, a resilient member located in said cylinder between said plunger and one end of said cylinder, said resilient member adapted to slide said cylinder on said plunger to move said door, and means whereby a too rapid expansion of said resilient member is prevented during the movement of said door.

14. In a door operating mechanism, a door, a cylinder carried by said door, a plunger mounted in said cylinder, an elastic medium in said cylinder, said elastic medium adapted to slide said cylinder on said plunger to move said door.

15. A door having a spring carrying member secured thereto, an abutment for the spring of said member, said spring and said abutment adapted to swing said door and cause said member to move on said abutment.

OLIVER L. LINK.

In presence of—
H. G. FLETCHER,
M. C. HAMMON.

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