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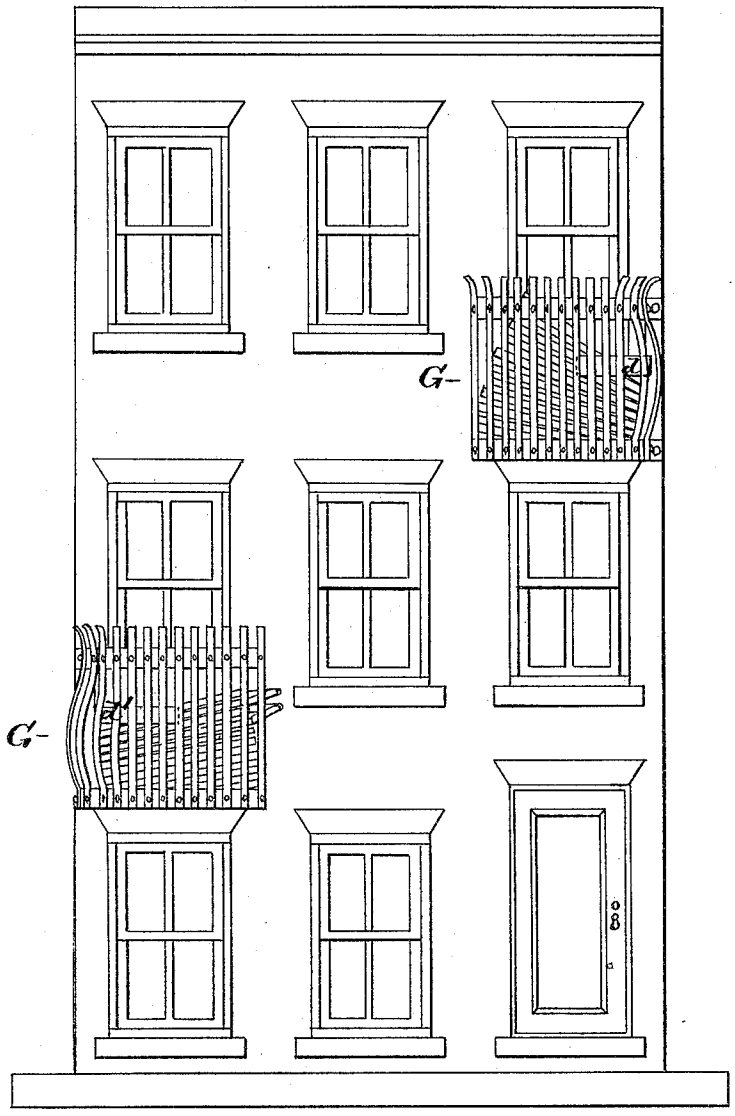
T. GARRICK.

Folding-Stairs for Fire-Escapes.

No. 169,096. Patented Oct. 26, 1875.

Fig. 1.



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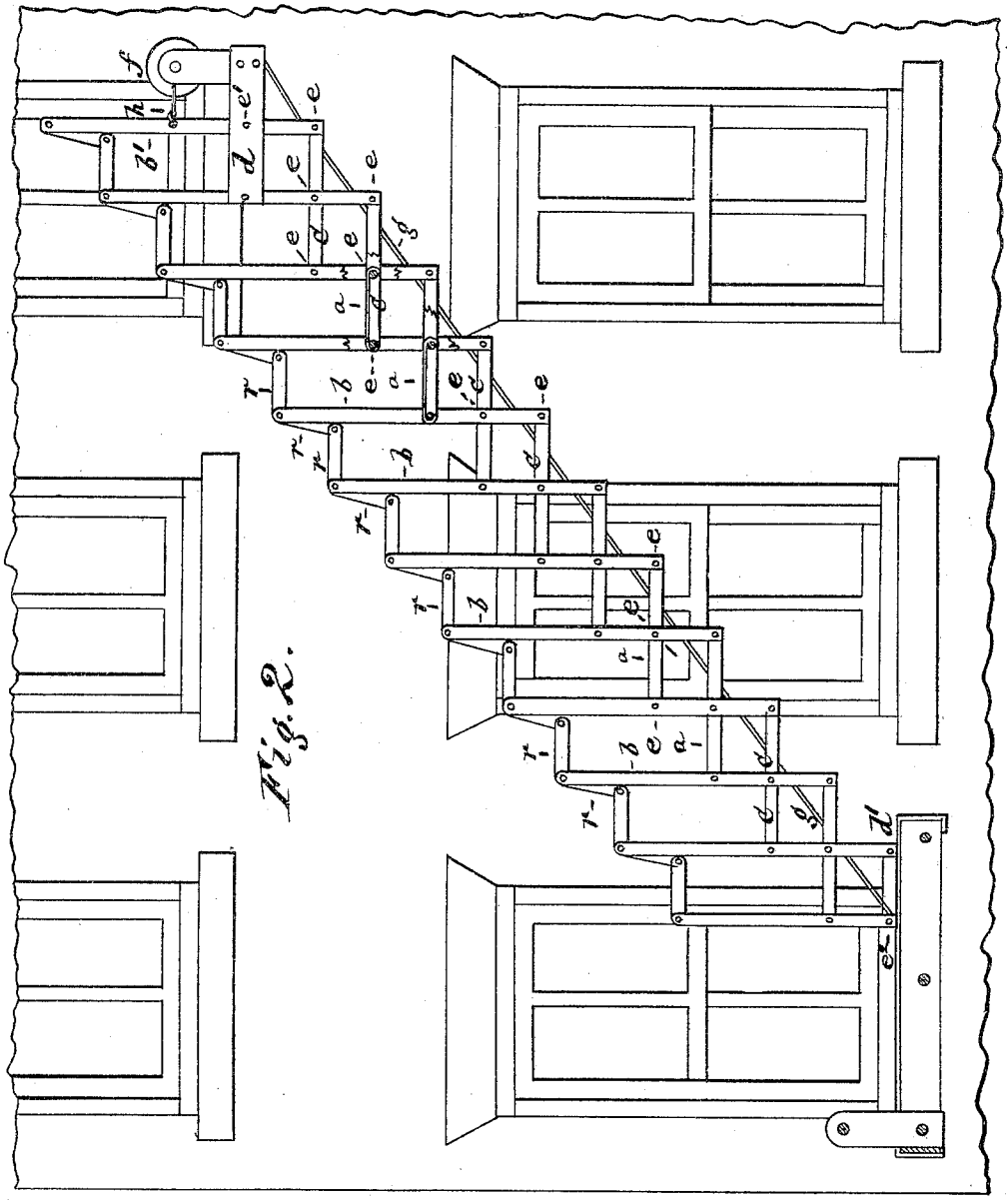

Fig. 2.

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3 Sheets--Sheet 3.

T. GARRICK.

Folding-Stairs for Fire-Escapes.

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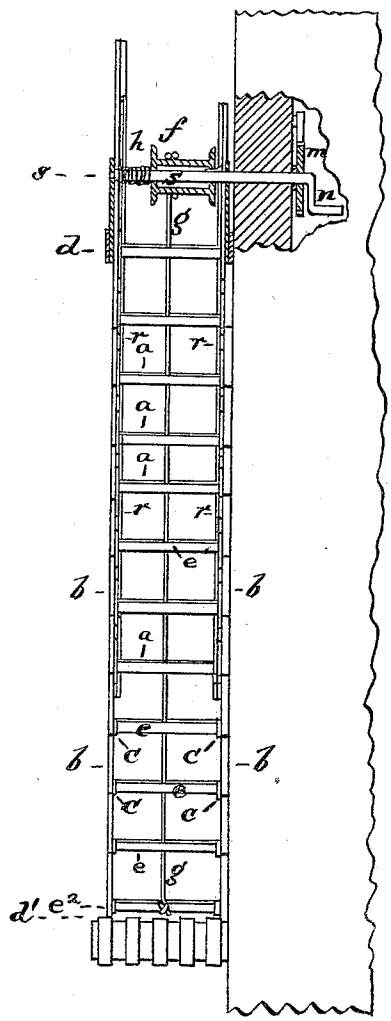
Fig. 3.



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UNITED STATES PATENT OFFICE.

THOMAS GARRICK, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR OF TWO-THIRDS HIS RIGHT TO WILLIAM H. REYNOLDS, OF SAME PLACE, AND MARTIN T. McMAHON, OF NEW YORK, N. Y.

IMPROVEMENT IN FOLDING STAIRS FOR FIRE-ESCAPES.

Specification forming part of Letters Patent No. **169,096**, dated October 26, 1875; application filed September 2, 1875.

To all whom it may concern:

Be it known that I, THOMAS GARRICK, of the city and county of Providence, and State of Rhode Island, have made an invention of a new and useful Folding Stairs for Fire-Escapes and other Purposes; and that the following is a full, clear, and exact description and specification of the same.

My invention consists of certain combinations of steps, levers, and links, which constitute a folding stairs, which may be employed as a fire-escape for buildings, or as a gangway-steps for ships, or for similar purposes. My invention consists, further, of the combination of the said folding stairs with a windlass by means of ropes, in such manner that the said stairs may be either unfolded and directed to the place of support for the lower end of the stairs, or may be folded up again at the level of the highest step or platform.

In order that my invention may be fully understood, I have represented in the accompanying drawing, and I will proceed to describe, a fire-escape embodying my invention in the best form at present known to me.

Figure 1 represents my apparatus folded up and in the position which it occupies when not in use, and with some portions removed. Fig. 2 represents the steps as unfolded and ready for use. Fig. 3 represents a rear view of the apparatus, partly in section.

My folding stairs is composed mainly of a series of steps, *a a a a*, of two sets of levers, *b b b b'*, and of links *c c c c*, the whole combined by means of pivots *e* e^1 e^2. The two series of levers and links are separated by the steps, so that each side of each step is sustained by the adjacent series of levers and links. The upper two levers of each series are pivoted to the platform *d*, with which the folding stairs are connected. The other levers are arranged parallel with the first two, and are pivoted to the steps. The links *c* are arranged parallel with each other and crosswise of the levers. The levers and links of each series, thus pivoted to each other, constitute a folding stair-horse, composed of a series of flexible parallelograms, which may either be extended in rectangular form, as seen in Fig. 2, or may be contracted, as seen in Fig. 1, so that their sides are drawn close together. In the former case the stairs are extended, and in the latter they are folded up.

In order that the extension and folding up may be accomplished readily a windlass, *f*, is provided, and the folding stairs is combined with this windlass by means of two ropes, *g h*. One of these ropes, *g*, is connected with the lowermost cross-pivot e^2, and is secured to the barrel of the windlass; hence, when this rope is unwound, by turning the windlass, the folding stairs is permitted to extend and unfold by gravitation. The second rope, *h*, is connected with the uppermost lever *b'*, and with the shaft *s* of the windlass, the connection with the lever being above the pivot e^1, that connects the lever with the platform. This second rope, also, is wound upon the windlass-shaft in the opposite direction to the first; hence, when the windlass is turned to lower the folding stairs, by letting out the lower rope *g*, the second rope is wound up, and the upper arm of the lever *b'* is thereby pulled toward the windlass, the effect of which is to cause the whole stairs to turn upward on the platform-pivot e^1 as a fulcrum, whereby the lower end of the stairs is directed upon the lower platform *d'*; or, if there be no platform, the stairs may be held at the right inclination to keep the steps level.

In order that persons may not fall sidewise from the stairs, the upper ends of all the levers *b b'* of one or both series are carried up high enough to form the balusters of a railing, and their upper ends are connected by links *r*, which, being pivoted to the upper ends of the levers and to each other, fold together and unfold when the stairs are folded up and extended, thus forming a folding hand-rail, and constituting, with the upper arms of the levers *b b'*, an effective folding stair-railing.

If preferred, a rope-rail may be substituted for the link-rail *r r*, and in such case the upper ends of the levers should be formed into eyes to hold the rope, which will fold up when the stairs are folded up, and will unfold with them.

In practice I prefer to make a separate fold-

ing stairs for each story of a building, and to inclose the platform with a railing, G, which is extended far enough below the platform to inclose the steps when folded together. I also prefer to make the joint-pivots of the steps long enough to extend beneath the steps from one compound series of levers and links to the other, so as to connect the two series and maintain them at their proper distances apart.

The windlass-shaft should be extended through the wall of the house to its interior, and be there fitted with a crank-handle, *n*, for turning it, and with a ratchet-wheel, *m*, controlled by a pawl, so as to secure the windlass when the stairs is either folded up or extended.

When the stairs is used as gangway-steps on a vessel, the lower end of the stairs may be suspended by a rope when extended, and the lowest step may be increased in extent, so as to form a lower platform.

I claim as my invention—

1. The combination, substantially as before set forth, of the steps, the series of levers, and the series of links, the whole constituting a folding stairs.

2. The combination, substantially as before set forth, of the steps, the series of levers, the series of links, the windlass, and the connecting-ropes.

3. The combination, substantially as before set forth, of the steps, the levers extended above the steps, the links, and the folding hand-rail connecting the upper arms of the levers, the whole constituting a folding stairs with a folding railing.

Witness my hand this 9th day of July, A. D. 1875.

THOMAS GARRICK.

Witnesses:

CHARLES SELDEN,

JOHN C. PURKIS.