J. A. FLYNN.

FOLDING STAIR.

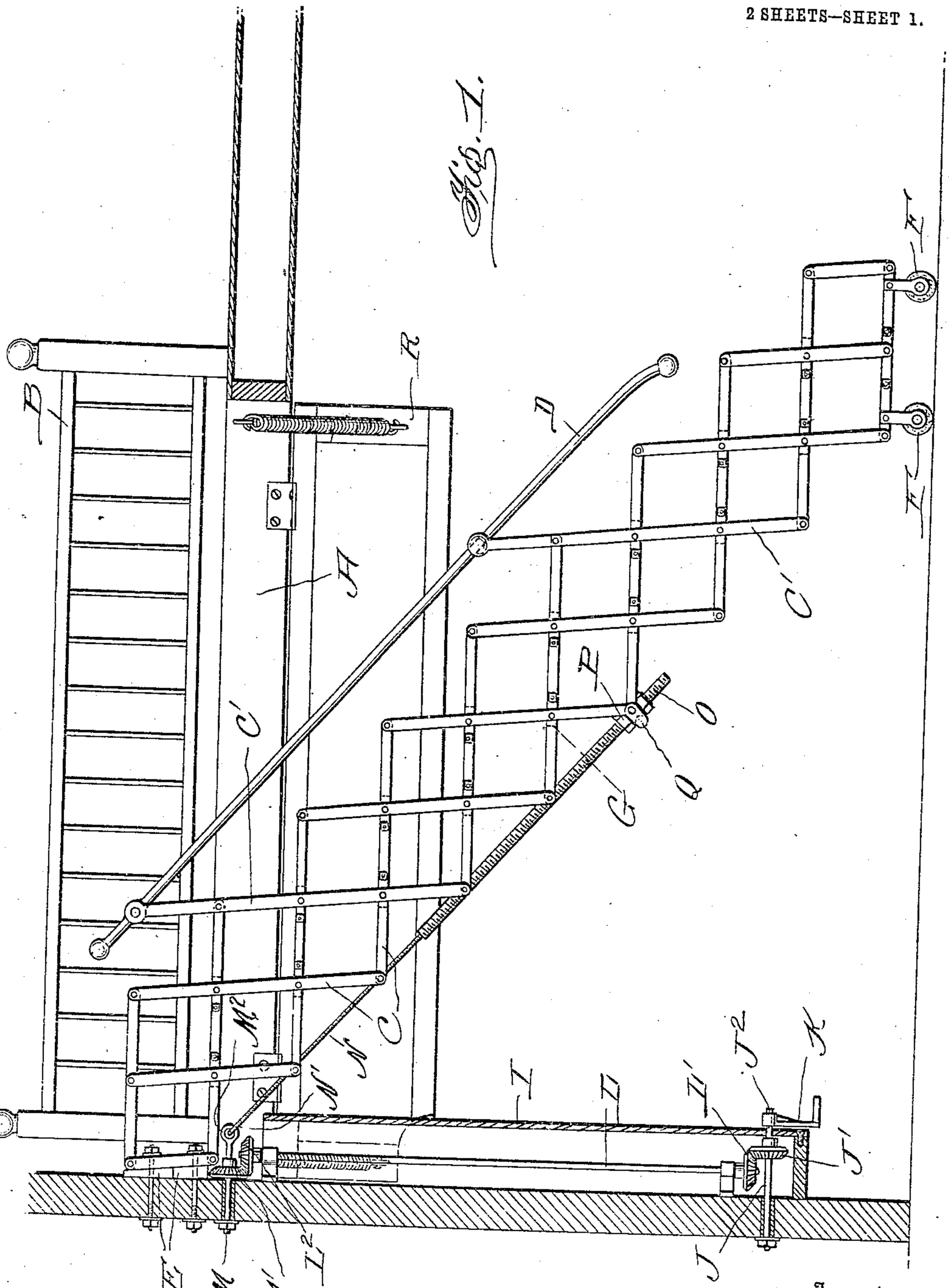
APPLICATION FILED NOV. 3, 1908.

943,672.

Patented Dec. 21, 1909.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

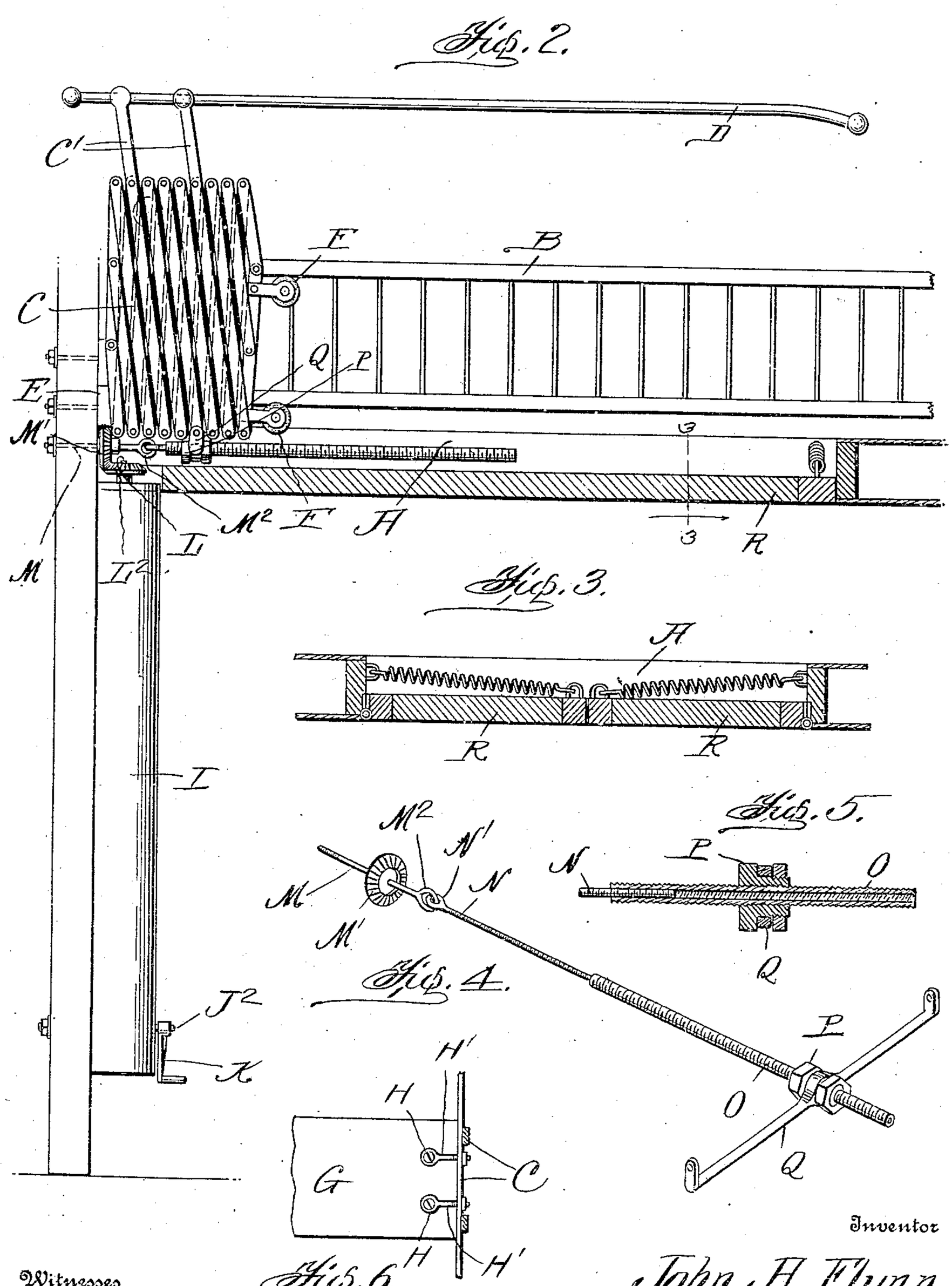

Fig. 3.

Fig. 5.

Fig. 4.

Fig. 6.

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UNITED STATES PATENT OFFICE.

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FOLDING STAIR.

943,672. Specification of Letters Patent. Patented Dec. 21, 1909.

Application filed November 3, 1908. Serial No. 460,909.

To all whom it may concern:

Be it known that I, JOHN A. FLYNN, a citizen of the United States, residing at Council Grove, in the county of Morris and State of Kansas, have invented a new and useful Improvement in Folding Stairs, of which the following is a specification.

This invention relates to certain new and useful improvements in folding stairs, the object being to provide very novel means for folding or extending the stairs.

Another object of my invention is to provide a pair of spring actuated doors in connection with the stairs adapted to close automatically after the stairs have been raised.

A further object of the invention is to provide novel means for securing the steps to the stringers.

A still further object of the invention is to provide a pair of stairs which are formed of lazy tongs which are so connected that they can be easily and quickly drawn up to a folded position or extended into a lowered position to be used.

A still further object of the invention is to provide a double adjusting screw for operating the lazy tongs which is composed of a solid screw member and a tubular screw member, one working within the other, the tubular member working in a nut carried by a brace connecting the lazy tongs.

With these various objects in view, my invention consists in the novel features of construction, arrangement and combination of parts hereinafter described, pointed out in the claims and shown in the accompanying drawings, in which:—

Figure 1 is a side elevation of my improved stairs, partly in section. Fig. 2 is a similar view showing the stairs in a folded position. Fig. 3 is a section taken on the line 3—3 of Fig. 2. Fig. 4 is a detail perspective view of the adjusting screw detached. Fig. 5 is a detail longitudinal section of the same, and Fig. 6 is a detail inverted plan view showing the manner of connecting the steps to the lazy tongs.

In the drawings, A indicates a stair opening and B the railing around the same, the above description being given so that the operation of my improved stairs can be readily understood.

In carrying out my improved invention, I employ spaced lazy tongs C comprised of a plurality of cross levers pivotally connected together, two of the cross levers as shown at C′ being of greater length than the others and to the upper ends of which are connected rails D. The upper ends of the levers of the lazy tongs are connected to a pair of adjustable wedges E secured adjacent the stair opening so that they can be readily adjusted and the lower ends of the lazy tongs are provided with rubber rollers F adapted to engage the floor when in a lowered position so as to prevent the stairs from injuring the floor as will be hereinafter fully described. The lazy tongs are connected together by steps G which are provided with plates H having outwardly projecting bolt portions H′ adapted to extend through the levers and be secured by bolts which securely support the step in position.

Secured to the wall under the stair opening is a casing I in which is mounted a horizontal shaft J provided with a beveled gear J′ and an outwardly projecting crank-receiving end J² on which a crank K is adapted to be placed for operating the same. The beveled gear J′ meshes with the beveled gear L′ secured on the lower end of a shaft L mounted within the casing and is provided with a beveled gear L² at its upper end which meshes with the beveled gear M′ of a horizontal shaft M which is provided at its outer end with a universal joint member M² to which the co-acting universal joint member N′ of a threaded shaft N is connected. The threaded shaft N works in the internally and externally threaded tubular shaft O which extends through the nut P carried by a brace Q secured between the lazy tongs by bolts as clearly shown, and it will be seen that when the crank is operated in one direction, the lazy tongs will be drawn together as clearly shown and when operated in the reverse direction, the tongs will be extended so as to lower the stairs in position to be used. By this arrangement of shafts, the tongs are drawn to a folded position quickly and at the same time the shafts will not extend but a slight distance out beyond the lazy tongs.

In connection with the folding stairs, I employ a pair of spring actuated hinged doors R which close automatically after the stairs have been drawn into a folded position and are opened by the stairs when the tongs are extended. It will be seen that by this arrangement, when the stairs are drawn

into a folded position, the doors will close and rest flush with the ceiling so as to close the stair opening.

From the foregoing description, it will be seen that I have provided novel means for operating the folding stairs which can be quickly placed into a folded position or extended in position to be used by simply operating a crank. It will also be seen that by providing the lower ends of the lazy tongs with rubber rollers, the stairs will be supported at their lower ends in such a manner that the floor will not be injured and at the same time, the rollers form buffers for the tongs so as to prevent the same from injuring the floor when extended.

While I have shown and described a peculiar shaft arrangement for operating the lazy tongs, it is of course understood that various other forms can be employed for accomplishing this result without departing from the scope of my invention.

What I claim is:—

1. In a structure of the kind described, the combination with spaced lazy tongs connected together by steps, a nut carried by said tongs, a hollow shaft carried by said nut, a second shaft working in said hollow shaft and means for operating the last mentioned shaft.

2. The combination with a stair opening, of adjustable wedge-shaped members secured above said opening, lazy tongs provided with rails connected to said wedges, steps connecting said lazy tongs, a brace connecting said tongs provided with a nut, an externally and internally threaded tubular shaft member mounted within said nut, a threaded shaft working within said tubular shaft, a shaft provided with a beveled gear, a universal joint connecting said threaded shaft to the shaft with the beveled gear and means for operating the shaft with the beveled gear.

3. The combination with a stair opening, of adjustable wedge-shaped members secured above said opening, spaced lazy tongs connected to said wedge-shaped members comprising a plurality of cross levers pivotally connected together, two of said levers being of a greater length than the others, rails carried by the last mentioned levers, spring actuated door for closing said stair opening and means for operating said lazy tongs whereby said doors will be opened by said tongs when thrown into an extended position.

4. The combination with spaced lazy tongs carrying rails and connected together by steps, a brace connecting said tongs provided with a nut, internally and externally threaded hollow shaft on said nut, a threaded shaft working in said hollow shaft, means for operating the last mentioned shaft, said means comprising a series of gears.

5. The combination with a pair of wedge-shaped members, spaced lazy tongs pivotally connected to said wedge-shaped members provided with rubber rollers at their lower ends, said lazy tongs being connected together by steps, of a brace provided with a nut arranged between said lazy tongs, and an externally and internally threaded shaft working on said nut, a threaded shaft working in said shaft provided with a universal joint member at its upper end, a shaft provided with a universal joint member connected to said member, a beveled gear carried by the last mentioned shaft, a shaft provided with a beveled gear meshing with said beveled gear, a shaft provided with a beveled gear and a crank, said beveled gear meshing with the beveled gear carried by the shaft, for the purpose described.

JOHN A. FLYNN.

Witnesses:
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