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Iron Stair.

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Fig. 3.

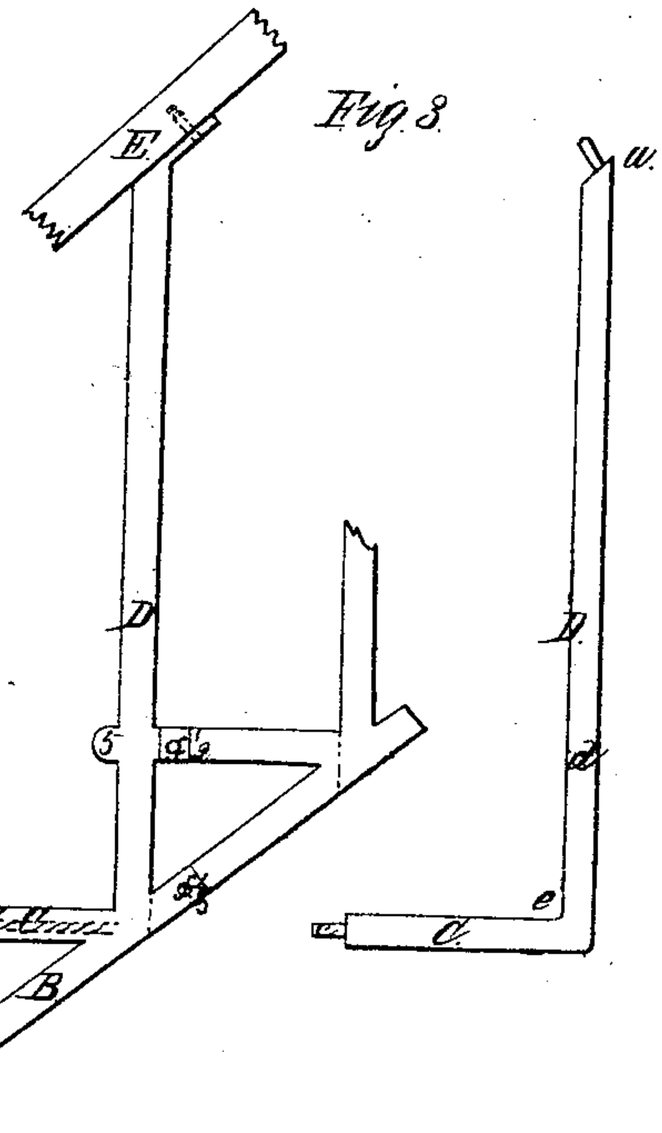


Fig. 4.

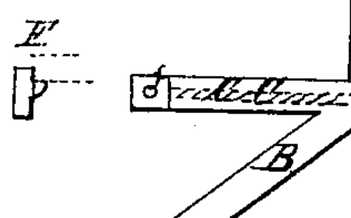


Fig. 1.

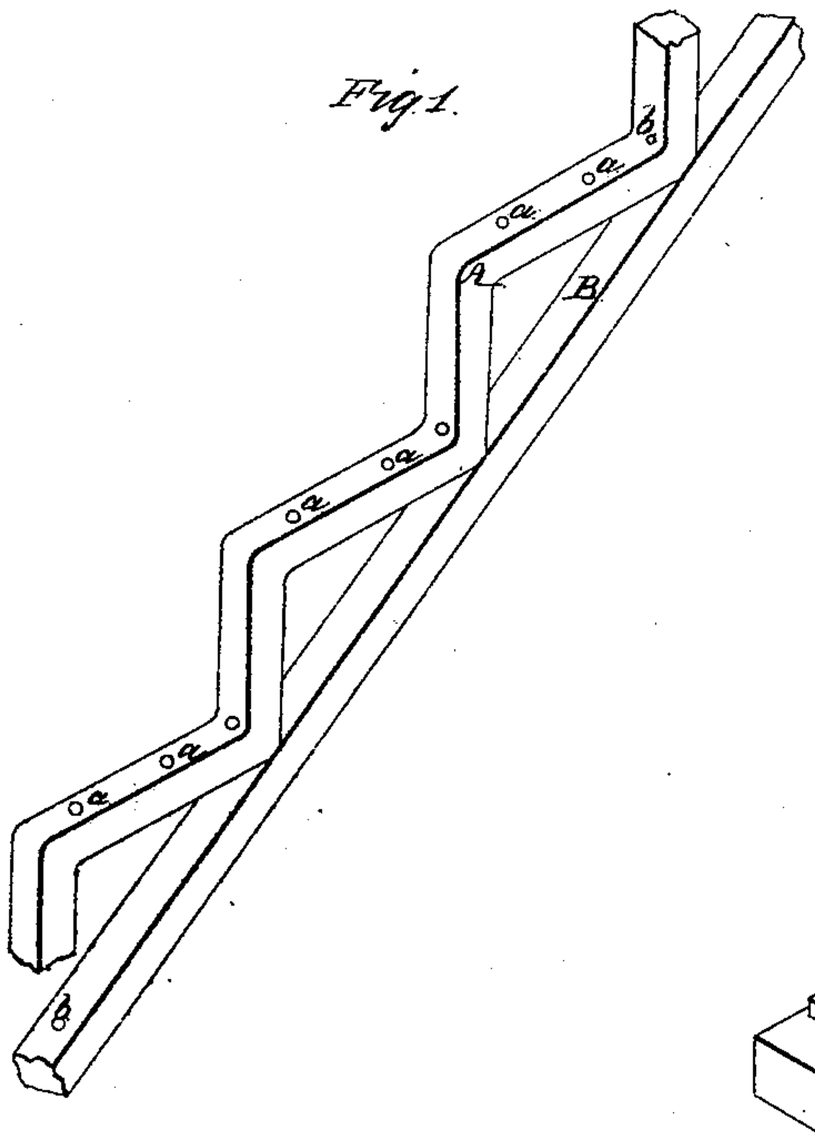
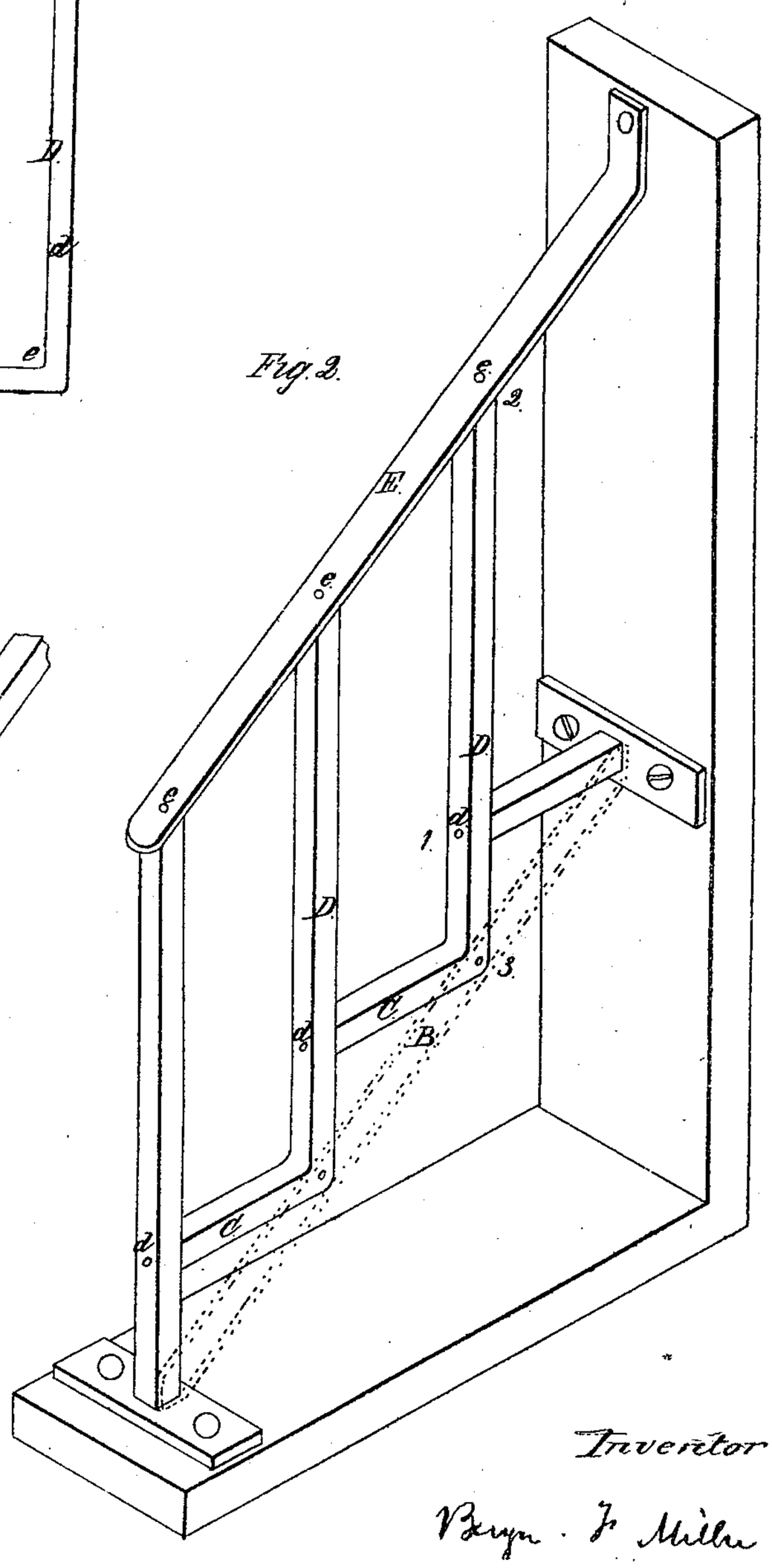


Fig. 2.



Inventor

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Fig. 5.

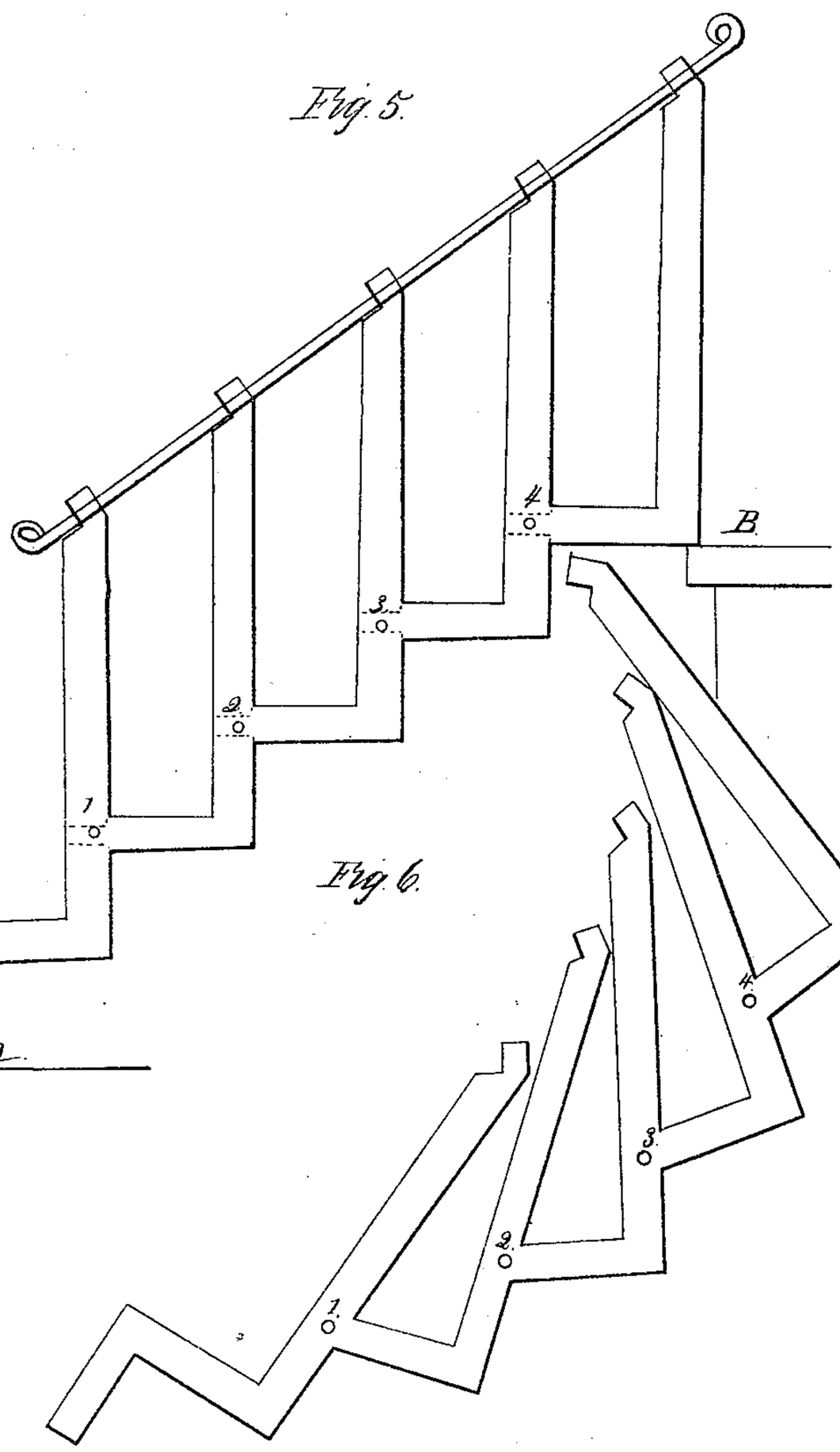

Fig. 6.

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Fig 7.

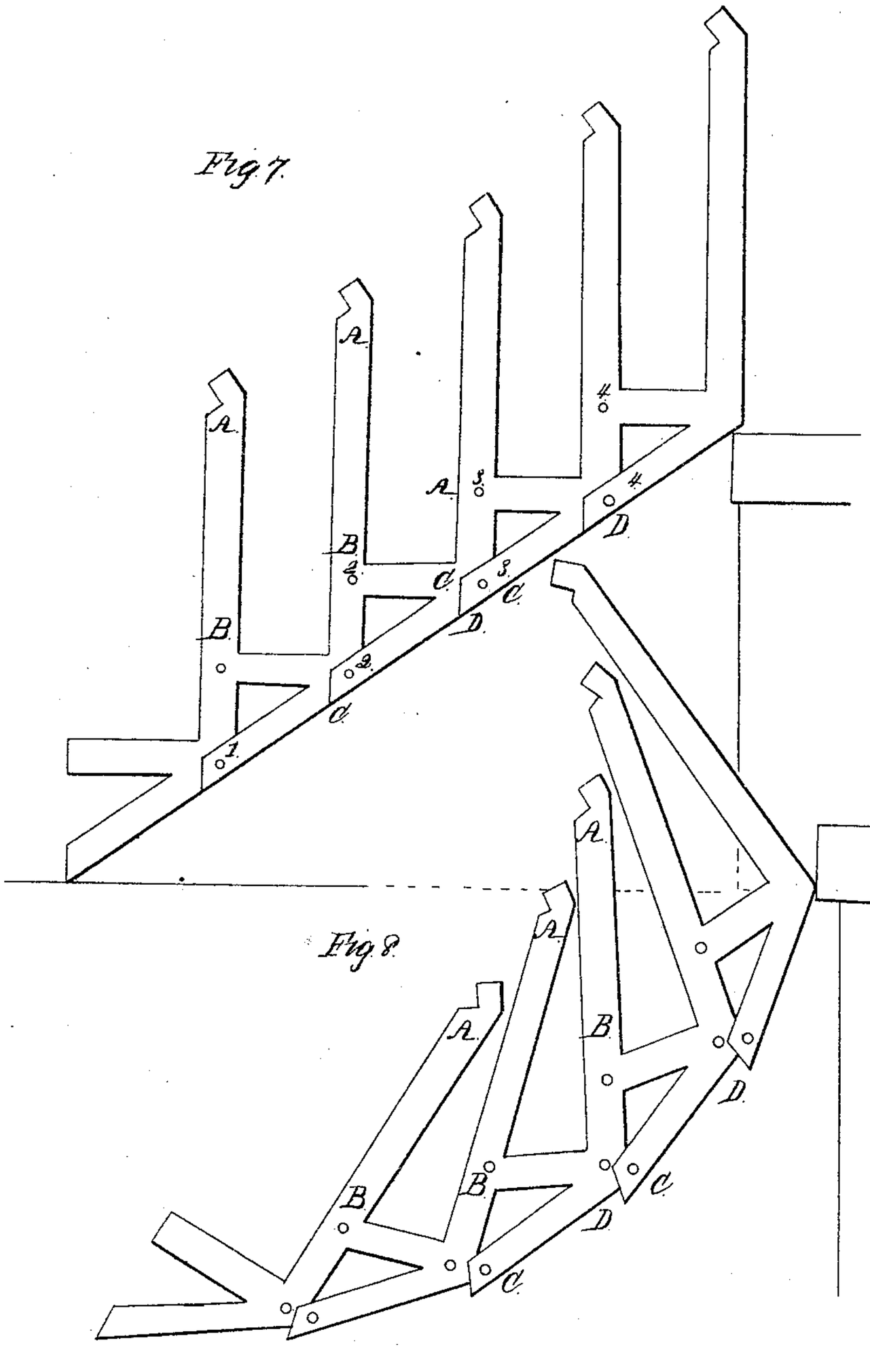
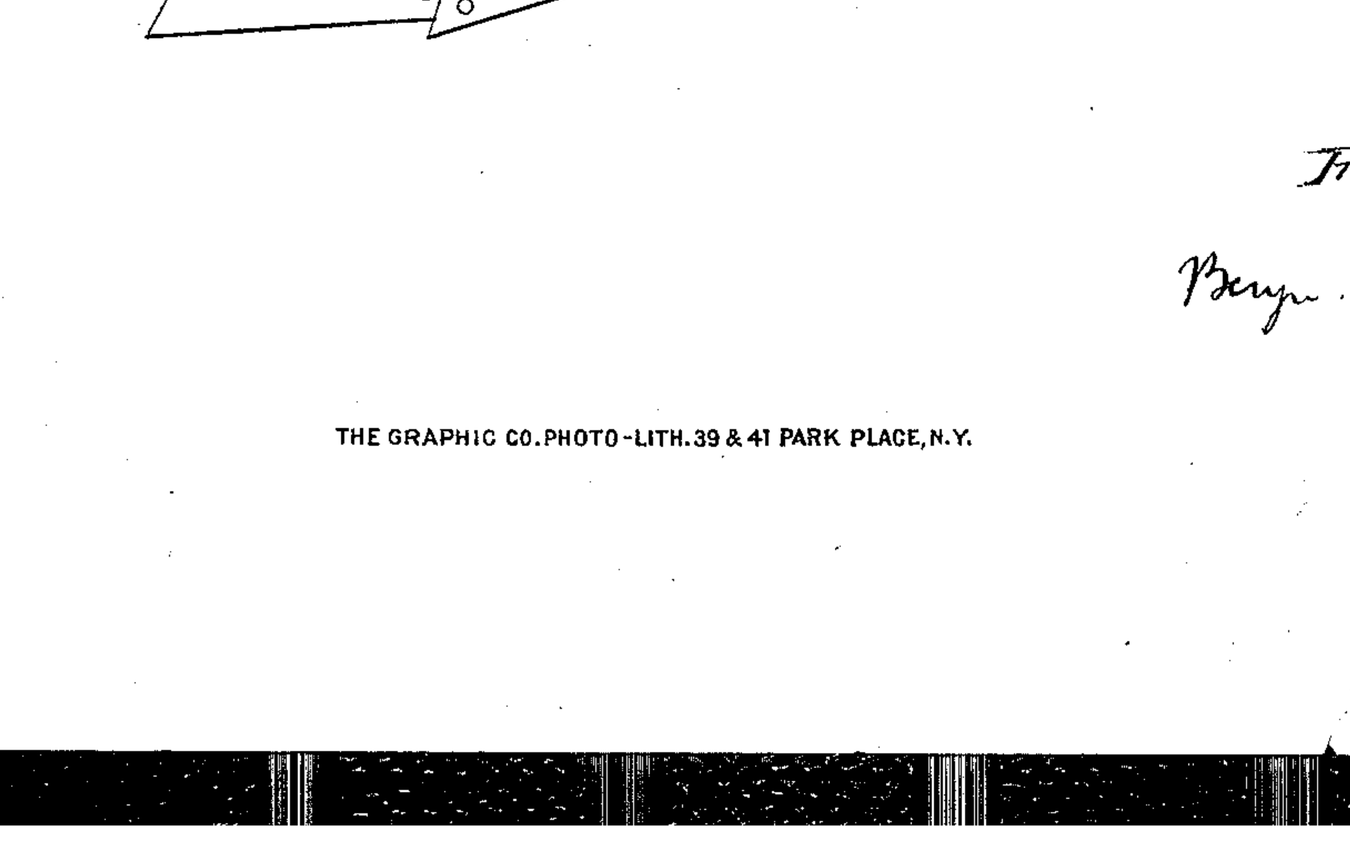


Fig 8.



Inventor

Benja. F. Miller

UNITED STATES PATENT OFFICE.

BENJ. F. MILLER, OF NEW YORK, N. Y.

CONSTRUCTION OF IRON STAIRS.

Specification of Letters Patent No. 6,810, dated October 23, 1849.

To all whom it may concern:

Be it known that I, BENJAMIN F. MILLER, of the city, county, and State of New York, have invented a new and Improved Mode or Method of Constructing Iron Stairs; and I do hereby declare the following is a full and exact description which will more fully appear, reference being had to the drawings herewith connected and forming a part of my specification.

My improvement consists in making use of what I term a series of "bent stationary levers." I take a bar of iron, see Figure 3, of sufficient length to form the "baluster" (*a a*), "rise" (*d e*), and "tread" (*c*). I bend a portion of said bars (*c e*) sufficient to form the tread at right angles to the part which is to form the rise and baluster. I finish either end of said bar with a tenon the upper end "*a*" for attaching it to the rail the other end "*c*" to be inserted and riveted into the mortise or hole at the height of the rise I require.

The stairs as constructed by me consist of a series or certain number of these bent levers, thus attached to each other and retained in their stationary and upright position by the rail E Fig. 2, which acting on the long arm (1, 2) of the lever accomplishes the object with less weight and strength of material than if a brace B B Fig. 1 be used and to it be riveted a continuous bar of iron A bent to form the tread and rise as stairs are now constructed and shown in said Fig. 1.

When a still lighter rail and additional strength is required I make use of a brace B Fig. 11 either continuous or in sections as hereafter shown riveting the same to the shorter arm 1, 3, of the lever at the angle or bend 3.

When constructing a stair of cast iron I construct the baluster rise, head and under brace all in one as shown in Fig. 4, having at $\frac{1}{2}$ a "lug" to which the end of the next tread is riveted and the end $\frac{1}{3}$ of the under brace B projects to receive and be riveted to, the brace of the next baluster rise and tread and so on in succession, on the inner side of the tread C a lip or ridge is cast to receive the plank or other material forming the step and the projection (5) on the front of the baluster E D, forms a finish to the front of the said step at either end.

The character of my mode of constructing stairs and the distinction between it and the mode of construction now known and in use will be evident by referring to Figs. 5 and 6, the former representing my stairs without the under brace kept in position by the rail and the latter showing the position it would assume if the rail be removed and the rivetings 1, 2, 3, 4, yielding to weigh upon the treads, from which it will appear that as long as the rail prevents the balusters from changing their perpendicular position the structure will resist incumbent pressure supported at its two extremes A, B. So also by referring to Figs. 7 and 8, the under brace will be found to perform the same function or produce a similar result with this difference that the rail acts more powerfully by taking hold of the long arm of the levers A, B, while the braces C, D, act on the short arm C A. The same effect produced by the rail and the under brace to wit, that of preventing the baluster from coming together at their ends or changing their upright position and fixed distance apart from each other. I also accomplish by fixing between the balusters light or ornamental casting or wrought work as fancy may direct.

When necessary I construct the rail in sections of a convenient length and make it continuous and of sufficient strength by riveting or "doweling" the segments together.

The advantages of my method of constructing stairs I consider to be the following: 1st. From being constructed in detached parts it can be completed in the shop, packed and transported and require only the labor of setting up. 2nd. By making the baluster rise and tread a "lever" I gain an increase of strength with a diminution in the weight of materials. 3rd. Connected with the latter mode of construction I obtain greater economy both in time and expense and greater facility of construction. 4th. By making the balusters enter into and form part of the "carriage" of the stairs, the tread can be removed and renewed more readily than in the mode now in use where the balusters are inserted in the treads. 5th. From the last mentioned mode of construction, increased strength is obtained, for in the ordinary mode of construction the balusters comparatively speaking give no strength to the "carriage" and depend for

strength and stability of position in a lateral and longitudinal direction to the firm fixing or attachment of either end of the rail.

Having thus described my improvement in the construction of metallic stairs and the advantages arising therefrom I claim as my invention and desire to secure by Letters Patent—

1. Constructing stairs in sections composed of the bent lever and under brace connected together as shown in Fig. 4, the tread and brace being part and parcel or continuous with the baluster, the one bent at right angles, the other at the requisite angle for the brace.

2. I also claim the bent levers as herein before described in combination with the rail either continuous or in sections attached to the end of the long arm of said lever together with the under brace attached to the angle or bend of the short arm of said lever.

BENJN. F. MILLER.

Signed in the presence of—
HAMILTON MORTON,
D. H. WURT.