No. 786,431. PATENTED APR. 4, 1905.

C. A. DE WITT.

WINDING STAIR.

APPLICATION FILED AUG. 12, 1904.

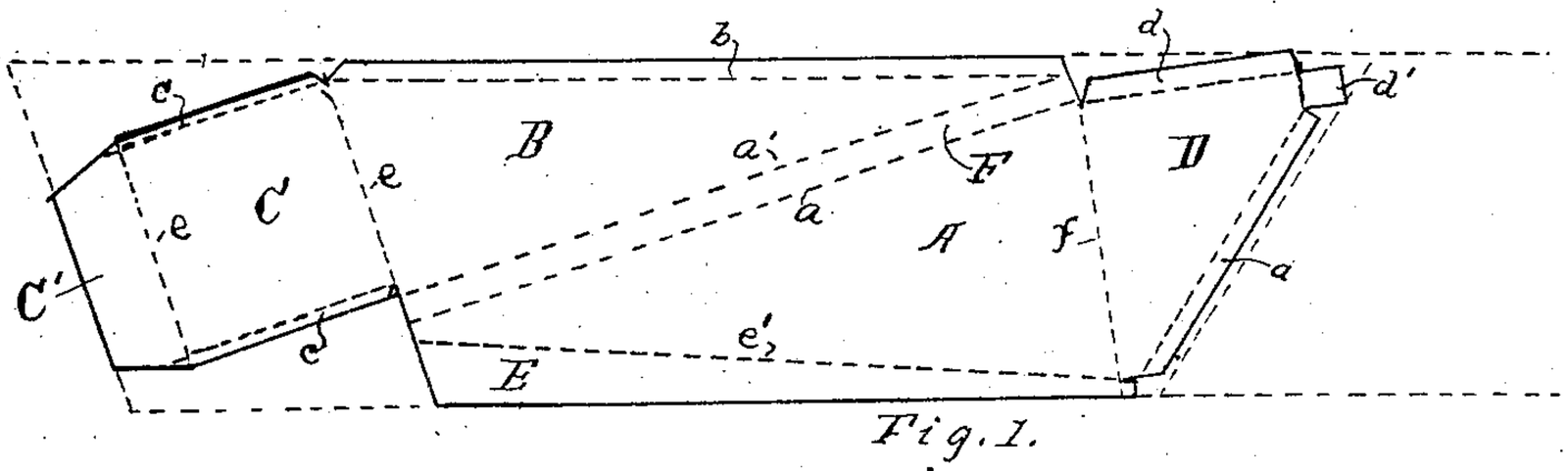

Fig. 1.

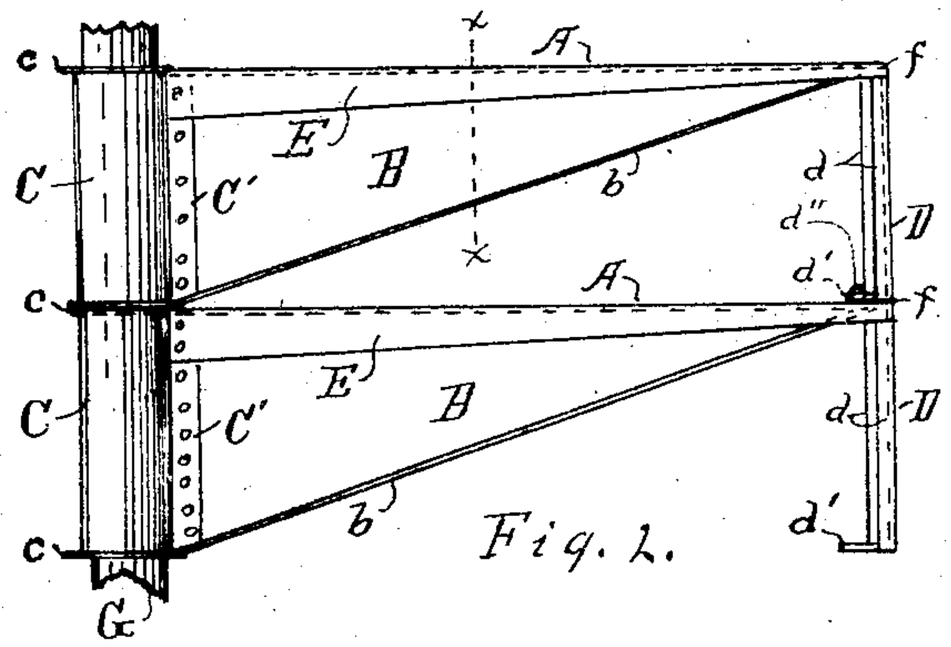

Fig. 2.

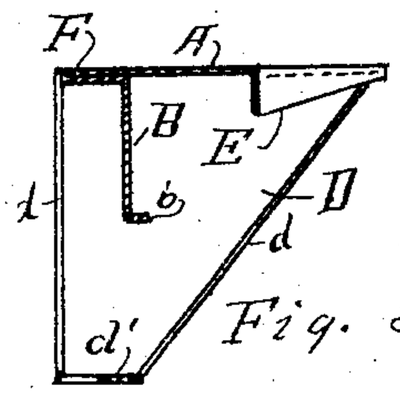

Fig. 3.

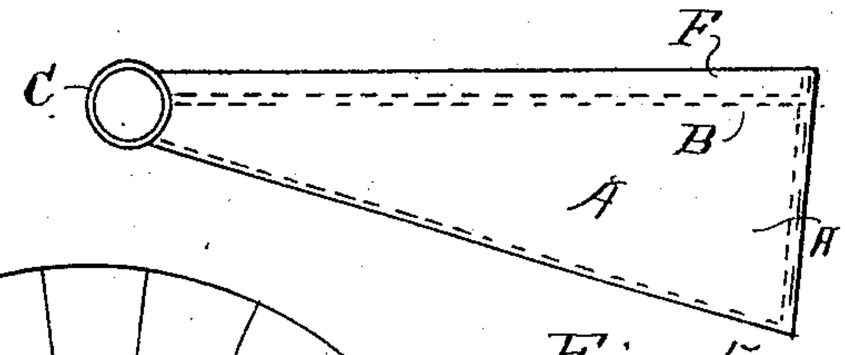

Fig. 5.

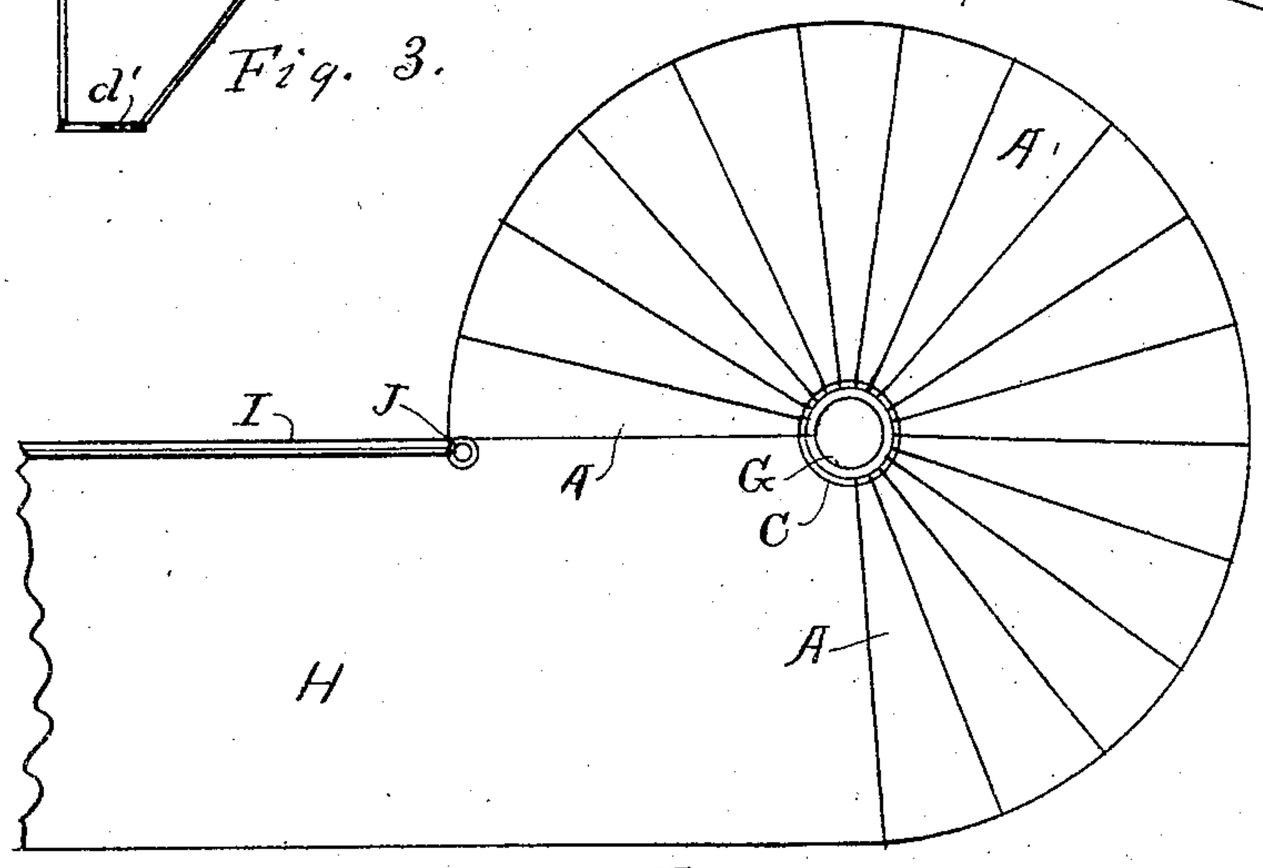

Fig. 4.

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No. 786,431. Patented April 4, 1905.

UNITED STATES PATENT OFFICE.

CHARLES A. DE WITT, OF GRAND RAPIDS, MICHIGAN.

WINDING STAIR.

SPECIFICATION forming part of Letters Patent No. 786,431, dated April 4, 1905.

Application filed August 12, 1904. Serial No. 220,582.

To all whom it may concern:

Be it known that I, CHARLES A. DE WITT, a citizen of the United States, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Winding Stairs, of which the following is a specification.

My invention relates to improvements in steps for winding stairs, and its objects are, first, to construct a step of a single piece of sheet metal that is strong and serviceable with the least possible amount of waste, and, second, to avert the danger of the center circles of thin sheet metal telescoping with or cutting the edges of each other. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a plan of the blank from which the steps are made, with a dotted outline showing the plan and relative size of the entire sheet from which it is cut. Fig. 2 is a back elevation of two steps in position. Fig. 3 is a transverse vertical section of a step looking to the right from the dotted lines *x x* of Fig. 2. Fig. 4 is a plan of a platform and steps in position, and Fig. 5 is a plan of a step detached from the stair.

Similar letters refer to similar parts throughout the several views.

A represents the tread of the step, and B represents the riser. To form a step from this, the sheet is bent down close, twofold, upon the line *a* and again bent upon the line *a'* to position, so that the riser B will stand at right angles with the tread A and form a folded projection F, placing the riser B back a short distance from the edge of the step, where it forms a brace to support the tread and its weight.

I form a cylinder C at the narrow end of the tread by forming a circle of the body C in Fig. 1 and riveting the flap C' fast to the riser B, with the lines *e e* together, as indicated in Fig. 2, the cylinders being of a proper diameter to fit closely upon the standard G, which is preferably made of a proper-sized water or gas pipe to form a water-stand in the center of the stair-well.

The leg D is formed by bending the sheet metal upon the line *f*, (see Figs. 1 and 2,) and the lower end *d'* is again bent at right angles, forming a step to rest upon and be riveted to the top of the tread of the step, as indicated at *d''* in Fig. 2. This leg should be of the exact length of the cylinder C and is strengthened by turning the edges back at *d d* to form narrow flanges, the riser being likewise strengthened by a flange turned back, as at *b*, and the tread is further strengthened at the back by the tapering flange or brace E, bent down from the line *e'*.

My appliance for preventing the cylinders from telescoping with or cutting each other consists of a narrow flange *c*, turned out at the upper and lower ends, forming a broader bearing-surface than the simple thickness of the metal would afford.

The riser B and tread A may be made of separate pieces of metal and riveted together through the flanges F, if desired; but I greatly prefer the one-piece tread and riser, as it is much more sightly and a great deal stronger.

As the ordinary railing around such stairs when open is well known, I do not deem it necessary to show or describe it here, but will say that any of the well-known railings now constructed may be used as a safety-guard to avert the danger of people falling off.

I design this step for use more particularly upon fire-escapes, the three-quarter well (shown in Fig. 4) being designed to extend at least one story from a landing H to a corresponding landing below, each story being provided with a similar set of steps and a landing.

I do not desire to restrict myself to this specific construction, as the construction may be variously modified, but do consider this the best and most reliable and safe construction.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a stair-step a sheet-metal tread and riser, a cylinder formed on the broad end of the riser, a supporting-flange at each end of said cylinder, a leg formed on the broad end of the tread, and strengthening-flanges formed upon the several parts, substantially as and for the purpose set forth.

2. In a stair-step, a tread and riser formed from a single sheet of metal, a cylinder formed

from the broad end of the riser and having flanges at the ends, a flange turned down from the back edge of the tread and the end of the sheet forming the cylinder riveted to the flanges and the riser, a leg formed from the broad end of the treadle, the tread folded to project over the riser, and strengthening-flanges, substantially as and for the purpose set forth.

3. In a winding stair, a tread, a riser, a cylinder, a leg and strengthening-flanges formed from a single piece of sheet metal, a standard passing up through the cylinders, and the legs provided with feet, and secured to the ends of the treads, substantially as and for the purpose set forth.

Signed at Grand Rapids, Michigan, August 9, 1904.

CHARLES A. DE WITT.

In presence of—
C. V. CILLEY,
ITHIEL J. CILLEY.