

(No Model.)

H. STOLLWERCK.
STAIRCASE.

No. 353,605.

Patented Nov. 30, 1886.

Fig. 1.

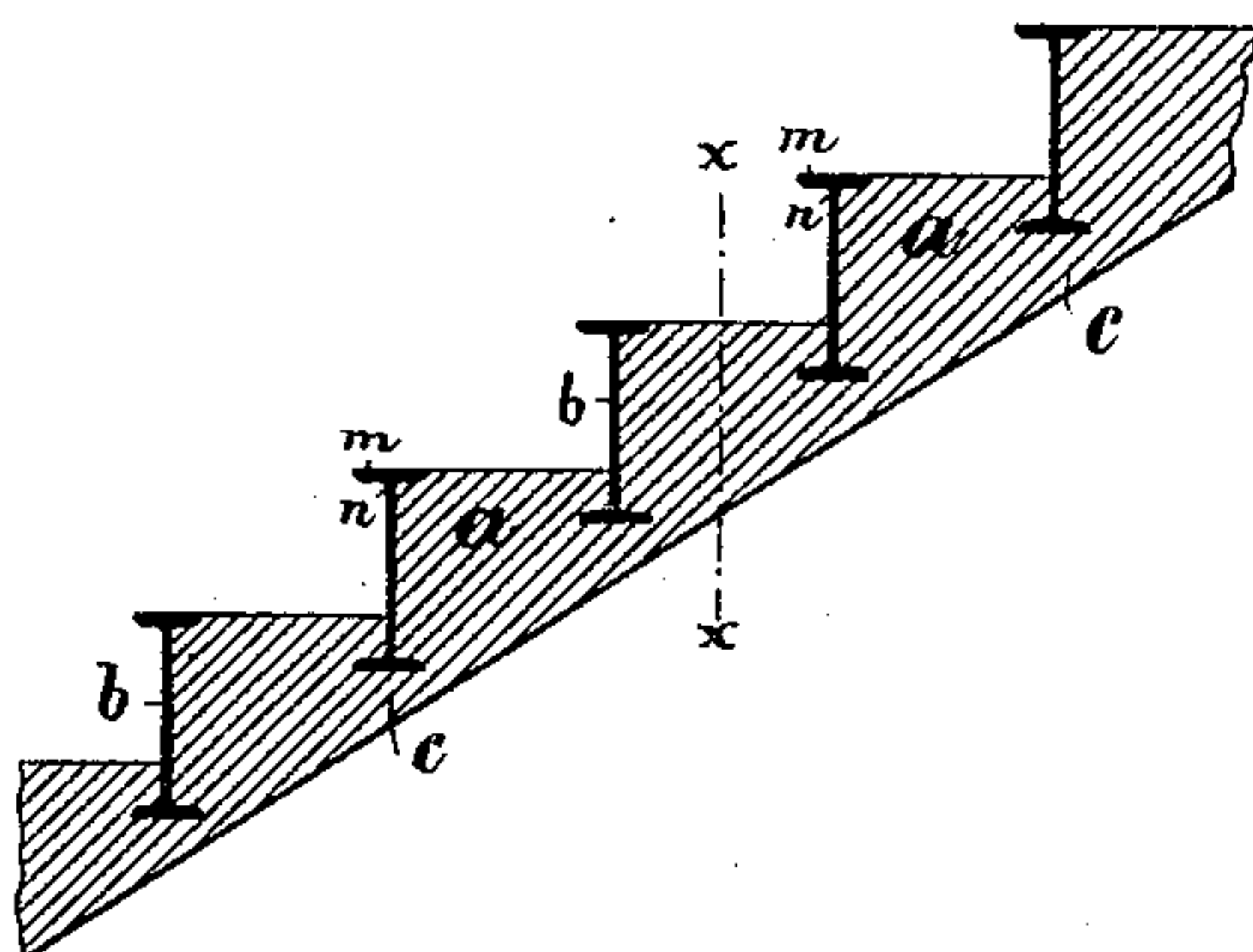


Fig. 2.

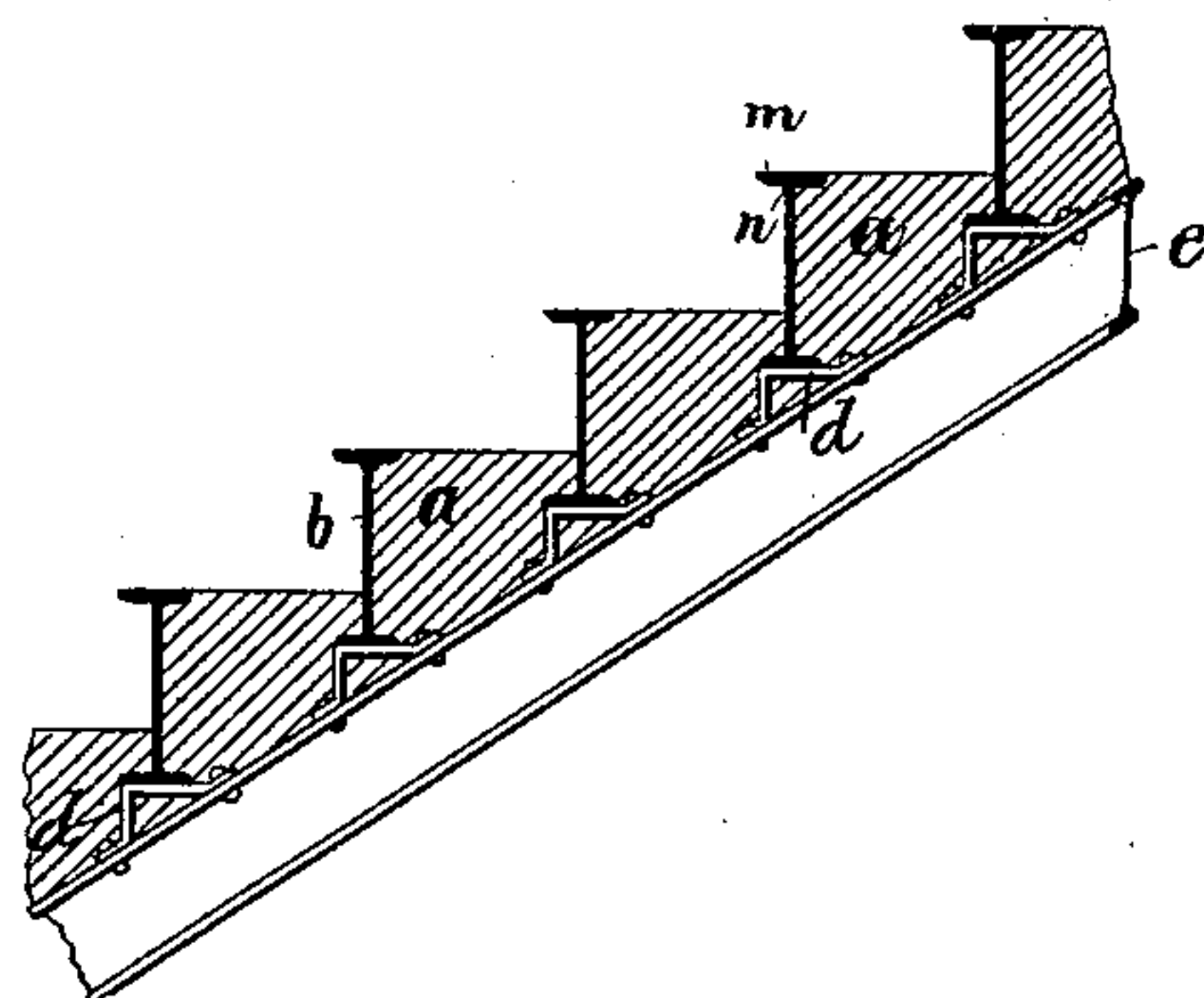


Fig. 4.

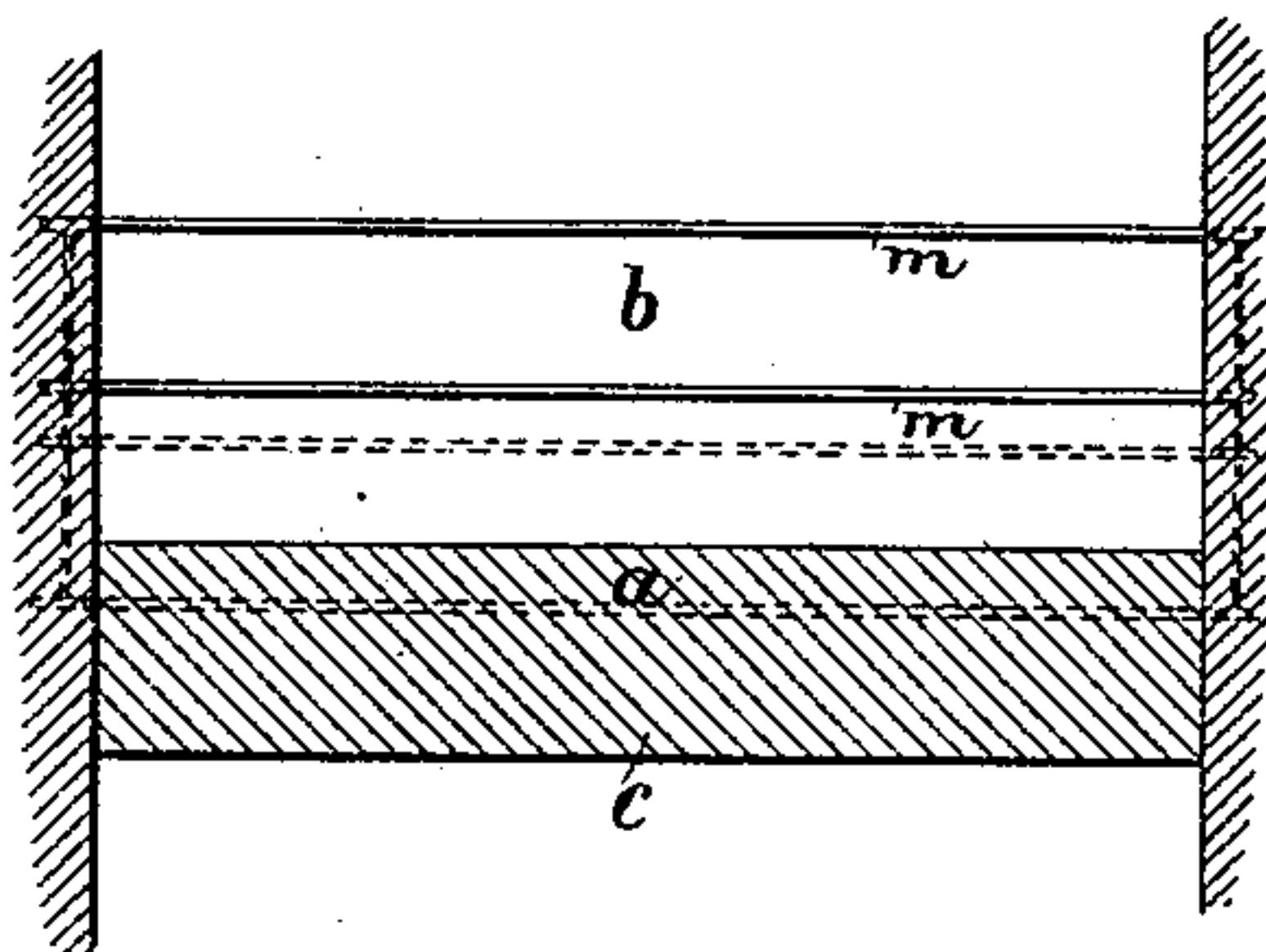


Fig. 3.

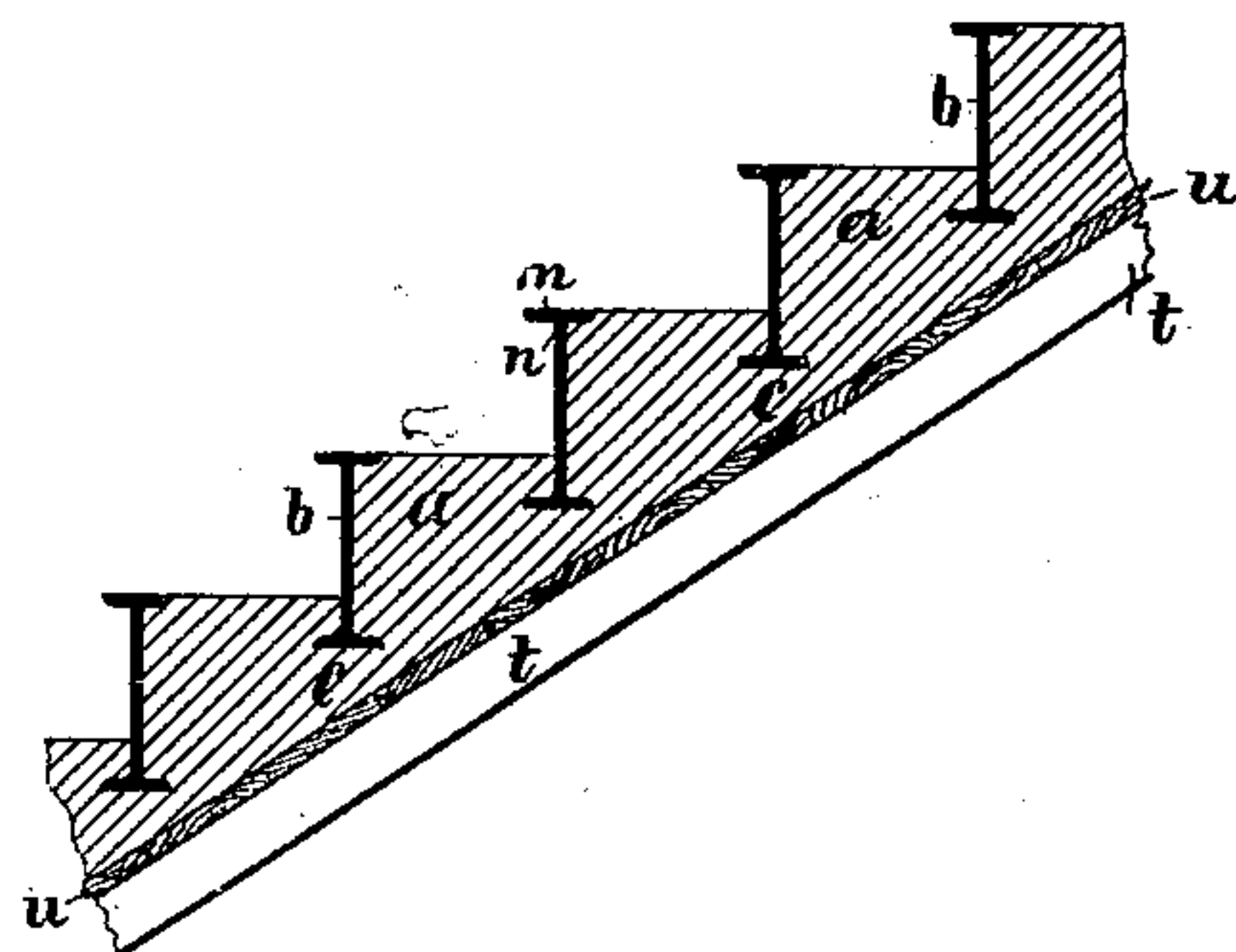


Fig. 5.

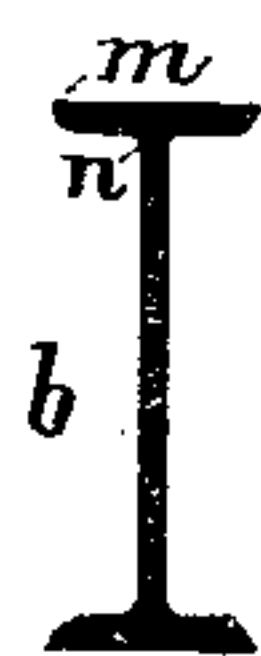


Fig. 6.

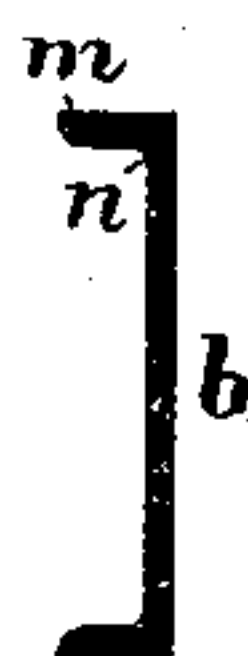


Fig. 7.



Witnesses,

Geo. W. Rea.

Robert Emmett.

Inventor:
Heinrich Stollwerck.
By
James L. Norris
Atty.

UNITED STATES PATENT OFFICE.

HEINRICH STOLLWERCK, OF COLOGNE-ON-THE-RHINE, GERMANY, ASSIGNOR
TO GEBR. STOLLWERCK, OF SAME PLACE.

STAIRCASE.

SPECIFICATION forming part of Letters Patent No. 353,605, dated November 30, 1886.

Application filed September 9, 1886. Serial No. 213,115. (No model.)

To all whom it may concern:

Be it known that I, HEINRICH STOLLWERCK, of the city of Cologne-on-the-Rhine, in the Kingdom of Prussia, and German Empire, have invented a certain new and useful Improvement in Staircases, of which the following is a specification, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

10 This invention relates to staircases, and has for its object to obviate the disadvantages and constructional difficulties heretofore existing in fire-proof and other staircases of various and well known kinds.

15 The invention consists in the combination, with supports or beams forming the vertical faces of the steps or stairs, of an intervening mass or filling of concrete in which the supports are embedded more or less, and by
20 which they are rigidly held together, the upper surface of the mass or filling forming the horizontal stepping-surfaces of the steps or stairs.

The improved staircase possesses the advantages of great durability, of affording sufficient safety against fire for all practical purposes, and of being easy of ascent, inasmuch as no obstacles are presented to the feet of the person or persons ascending the same.

30 The invention is illustrated in the accompanying drawings, in which Figure 1 is a side view of part of the improved staircase. Fig. 2 is a side view of part of a staircase of a somewhat modified construction. Fig. 3 is a side view illustrating the manner in which the improved staircase is constructed. Fig. 4 is a transverse section on the line $x x$, Fig. 1. Figs. 5, 6, and 7 are sectional views of some forms of the beams or supports.

40 The improved staircase is made of beams, consisting either of rolled iron or other suitable material—such as pressed paper or wood pulp—the said supports or beams being connected in a peculiar manner by means of cement concrete. This concrete is filled into the spaces between the said supports or beams while in a soft state, so as to cover or embed the latter fully on one side and partly on the other side and to firmly connect the said supports or beams after the intervening mass of

concrete becomes dry, hard, and solid, and thus to hold them in position.

Referring to the accompanying drawings, the intermediate bodies, a , of concrete forming the stepping-surfaces are carried or held by the supports or beams b , the latter admitting of any suitable sectional shape—such, for instance, as shown in Figs. 5, 6, or 7—and forming on their part the vertical surfaces of each step or stair. When the staircase is to be built between two walls, the supports or beams b are sunk into such walls, the latter serving as the carriages of the staircase.

Preparatory to filling in with concrete, a bottom, u , Fig. 4, of boards, is provided below the supports b in such a manner as to support the mass of concrete which is filled in from above. The filling with concrete may be commenced either from the foot of the staircase or from the head. As soon as the several bodies a of concrete have become sufficiently hardened so as to form with the intervening supports or beams b one coherent solid mass, (which generally requires but a few days' time,) the board bottom is taken away and the staircase remains as shown in Fig. 1.

In cases where the position of the staircase does not admit of using the walls of the building as side supports or carriages, and it becomes necessary to provide special carriages e for the staircase, angular pieces d , Fig. 2, of iron are mounted on the said carriages e , thus serving as seats or bearings for the supports or beams b . In every other respect the construction is the same as already described.

The surface of the concrete of the several stairs may be smoothed, ornamented, coated, or covered with wood, india-rubber, or other desirable material in the well-known manner.

The advantages of the improved staircase above described, as compared with staircases of other constructions, are evident, especially since the concrete used in its construction improves in hardness and solidity from day to day, thus securing additional durability and carrying capacity and offering every possible safety in case of fire.

Another material advantage of the improved staircase is to be found in the fact that the projecting part m of each stair forms a hollow

space below it sufficiently large to prevent the feet of persons ascending the stairs from forcibly striking against the vertical portion *n*.

Having thus described my invention, what
5 I claim as new, and desire to secure by Letters Patent, is—

In a staircase, the combination, with the supports or beams *b*, forming the vertical faces of each stair, of an intervening mass or filling,
10 *a*, of concrete, in which the said supports or beams are more or less embedded, and by which

they are rigidly held together, the upper surface of said mass forming the horizontal stepping-surface of the step or stair, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HEINRICH STOLLWERCK.

Witnesses:

EMIL WOLF,
GUSTAVE ALBERT OELLIELES.