

No. 619,769.

Patented Feb. 21, 1899.

L. W. G. LILIENTHAL.  
FIREPROOF CEILING.

(Application filed May 17, 1898.)

(No Model.)

Fig 1.

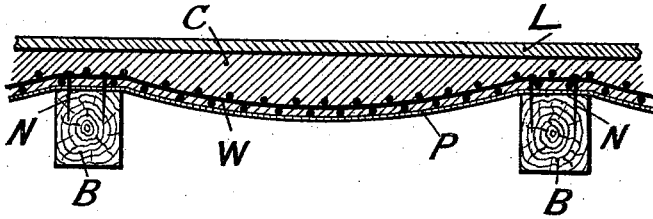


Fig 2.

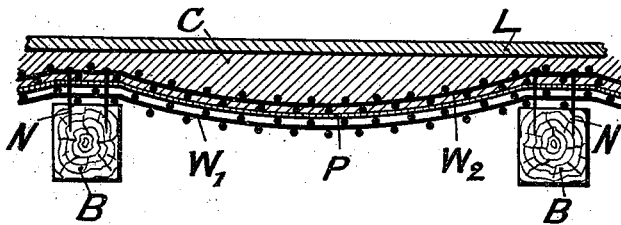
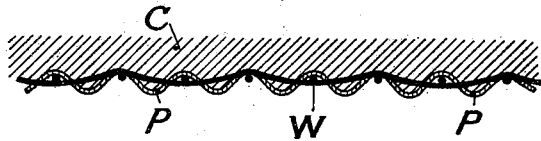


Fig 3.



WITNESSES:

Witford C. Massie,  
Anton A. Kloetzer.

INVENTOR:

Louis Wilhelm Gustav Lilienthal

by ATTORNEY:

W. J. T. T. T.

# UNITED STATES PATENT OFFICE.

LOUIS WILHELM GUSTAV LILIENTHAL, OF GROSS LICHTERFELDE, GERMANY.

## FIREPROOF CEILING.

SPECIFICATION forming part of Letters Patent No. 619,769, dated February 21, 1899.

Application filed May 17, 1898. Serial No. 680,968. (No model.)

*To all whom it may concern:*

Be it known that I, LOUIS WILHELM GUSTAV LILIENTHAL, a subject of the German Emperor, residing at Gross Lichterfelde, near Berlin, in the Kingdom of Prussia, German Empire, have invented certain new and useful Improvements in Fireproof Ceilings; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to a fireproof ceiling and the method of constructing the same.

The invention consists in spreading some pliable but sufficiently impermeable fabric or paper over the beams intended to carry the ceiling that is to be built, of covering the fabric with wire-netting, and of pouring concrete on the top of the covering thus formed.

In the accompanying drawings, Figures 1 and 2 are cross-sections through different modifications of my improved ceiling; and Fig. 3 is likewise a cross-section of a part of my ceiling, executed on an enlarged scale and showing the way in which the constituents of the new ceiling cooperate to form a strong and durable flooring.

The same letters of reference are used to signify the same parts in all the drawings.

B B are two beams placed side by side in the way ordinary in the construction of ceilings or floors.

P is a layer of paper or any suitable fabric sufficiently impermeable to allow concrete to be poured upon it without giving way.

W in Fig. 1 and W' W<sup>2</sup> in Fig. 2 are layers of wire-netting loosely spread over the beams B B and provisionally fastened in their position by tacks or nails N N.

C is a thick layer of concrete poured over the covering thus formed and allowed to set when in position. L is a layer of linoleum or any other suitable covering spread over the surface of the concrete.

In constructing my improved ceiling I proceed as follows: A layer of paper or any pliable fabric is first loosely spread over the beams when they are in position, care being taken to allow a considerable amount of slack. Over this a second layer of wire-gauze is then spread and approximately the same amount

of slack is given it as the underlying paper. By driving tacks or nails into the beams this covering is provisionally held in position to prevent any displacement during the following operations. Concrete is then poured upon the covering thus formed until it has filled up the cavities formed by the slack of the fabric, and a perfectly even surface is thus obtained. When the concrete has set, the ceiling is finished and can be completed by simply laying down linoleum on the top and by fastening an ornamental covering of the usual kind on the lower edges of the beams.

This improved ceiling possesses a very considerable strength because the wire strands lying across the beams take up all the tensile strains, and it is found that when a flooring made according to this invention is ever so heavily weighted the carrying-wires will never be drawn out at the edge of the gauze because by their being embedded in the lower surface of the concrete so much friction is set up between them and the latter that even when the flooring is weighted until breakage takes place the wires will rather snap in the middle than draw out at the ends. In order to obtain this result, I prefer to put down the paper first, so that the concrete settling down upon it will surround and firmly hold in position the wire-gauze. However, I have also found that almost as good a result is obtained if the paper is placed over the wire-gauze. This mode of proceeding is illustrated on an enlarged scale in Fig. 3. What happens is that the paper is softened by the damp contained in the liquid concrete and bulges out into every single mesh of the wire-netting, thus forming a surface similar to that of a sofa-cushion, and thus the single strands of the wire-netting are held as firmly as if they were bodily embedded in the concrete.

If special strength is required, I prefer not to use stronger wire-netting, but rather to put down two or even more layers, because it is well known that two wires are more reliable than a single one having the double section. In such cases I employ the construction shown in Fig. 2, where one layer of wire-netting is placed below the paper and one layer above the same.

It will thus be seen that in each of the

forms hereinabove described the essential feature of my invention consists in employing the combination of closed and open fabrics, one placed over the other, in combination  
5 with a layer of cement, the first-named layers being preferably so attached to the supporting beams as to allow considerable slack.

It is, moreover, a feature of my invention to have the cement filling arranged entirely  
10 above these layers of flexible material.

By the term "cement" I mean any material used in the construction of floors and ceilings—such as Portland cement, mortar, concrete, or the like.

15 Having now particularly described and ascertained the nature of my said invention and the manner in which the same is to be performed, I declare that what I claim is—

1. An improved ceiling or flooring consisting of a combination of paper or other closed fabric and wire gauze or netting spread out  
20 over the floor-carrying beams with considerable and approximately the same amount of slack in combination with a layer of cement  
25 poured on the top of the covering so formed and allowed to set, substantially as and for the purpose set forth.

2. An improved ceiling or flooring which consists of a layer of paper or closed fabric

spread over the beams intended to carry the flooring and having a slack, one or several  
30 layers of wire gauze or netting spread over the said paper or fabric and another layer of wire gauze or netting laid under the said  
35 paper or fabric, the layers of wire gauze or netting having substantially the same amount of slack, in combination with a layer of cement poured on top of the covering so formed, substantially as set forth.

3. An improved ceiling or flooring which  
40 consists of a layer of paper or fabric spread over the beams intended to carry the flooring and having a slack, one or several layers of wire gauze or netting spread over the said  
45 paper or fabric and another layer of wire gauze or netting laid under the said paper or fabric, all layers of wire gauze or netting having approximately the same amount of slack in combination with concrete or cement  
50 poured on the top of the covering thus formed and allowed to set when in position, substantially as and for the purpose set forth.

In testimony whereof I have affixed my signature in presence of two witnesses.

LOUIS WILHELM GUSTAV LILIENTHAL.

Witnesses:

C. H. DAY,  
HENRY HASPER.