

(No Model.)

O. W. NORCROSS.
FIREPROOF FLOOR.

No. 596,534.

Patented Jan. 4, 1898.

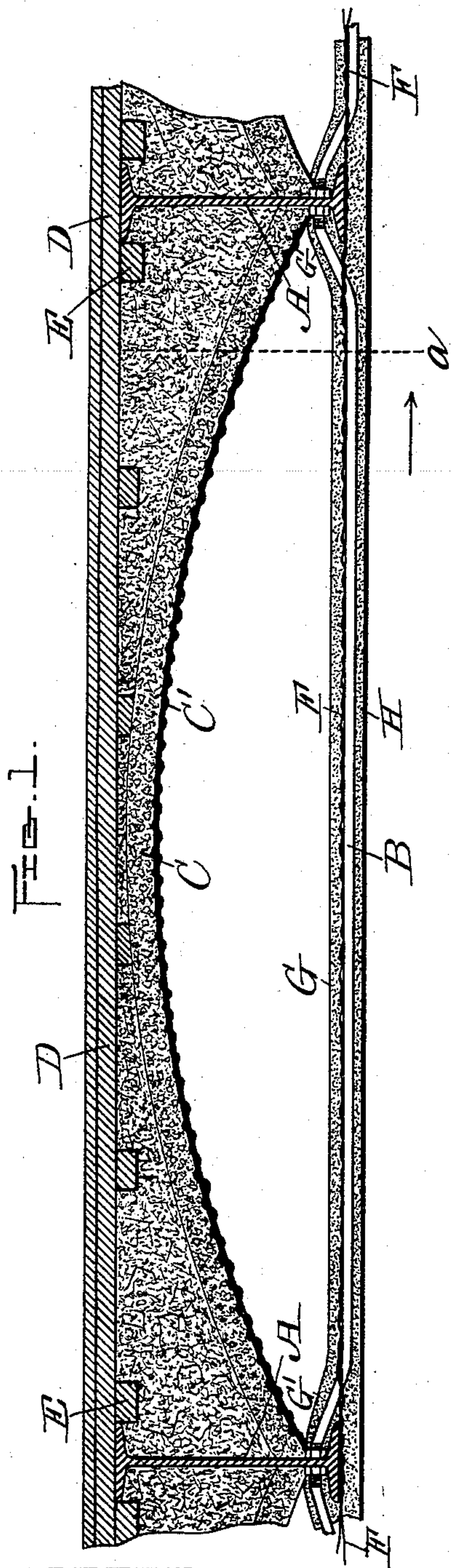


Fig. 1.

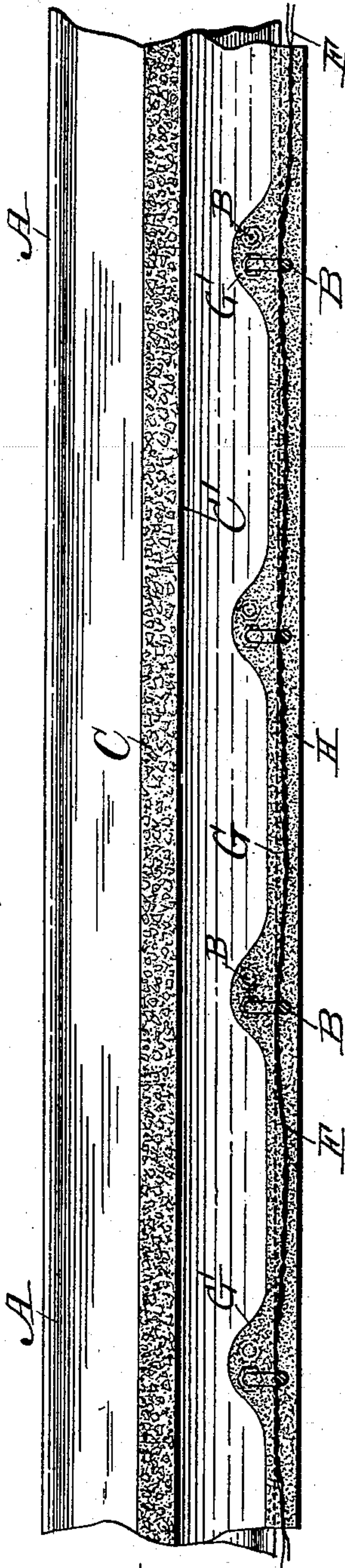


Fig. 2.

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UNITED STATES PATENT OFFICE.

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FIREPROOF FLOOR.

SPECIFICATION forming part of Letters Patent No. 596,534, dated January 4, 1898.

Application filed March 8, 1897. Serial No. 626,375. (No model.)

To all whom it may concern:

Be it known that I, ORLANDO W. NORCROSS, of the city and county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Fireproof Floors; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 represents a section of fireproof flooring embodying my improvements, taken transversely through the arches and beams thereof; and Fig. 2 is a similar section taken on line *a* longitudinally therethrough, the filling over the arches and top wood flooring being omitted in this figure.

My invention relates to that class of fireproof floors in which arches and steel beams are used for the support of the upper flooring. The object thereof is to provide a floor of this class which shall embody perfect fireproof qualities, and also strength, simplicity, and economy of construction; and it consists in combining with the usual steel floor-beams and tie-rods arches of cement concrete interposed between each pair of beams, and also said parts combined with the filling of mortar, broken bricks, or similar material over said arches for leveling up to the usual wood flooring on top, said wood flooring, a layer or sheet of wire mesh or other metal lathing extending over the whole ceiling below said floor, laid on top of the tie-rods and under the beams, and coatings of mortar applied to said metal lathing above and below the same, as will hereinafter be more fully set forth.

In order that others may better understand the nature and purpose of my said invention, I will now proceed to describe it more in detail.

In the drawings, A A represent two of the usual steel beams, B the tie-rods employed in fireproof floor construction for tying said beams transversely, and C one of the cement concrete arches interposed between said beams. Over said arch C the space may be filled in solid up to the level of the wood-floor lining D with mortar, broken bricks, or other suitable material to form a solid bed for the wood flooring to rest upon, the latter being, as usual, fastened to wood strips E, bedded in said mortar. In building said ce-

ment concrete arches sheet-metal centers C' are provided in practice upon which to lay the concrete, which may be left permanently in place or removed after the arches become thoroughly set and hardened; if removed, being drawn out longitudinally from under said arches. A continuous layer or sheet of metal lathing F, preferably wire-mesh lathing, is placed over the tie-rods B, the same being extended under the steel beams A, and it is sufficiently fastened to properly hold it in place until plastered thereon. Then a coat of preferably coarse mortar G is applied over said metal lathing, the same being also spread over the ends of the tie-rods to cover and protect the same, as is shown at G' in the drawings, and finally one or more coats H of mortar are applied to the under side thereof to form the usual plaster ceiling of the room below.

The above construction of course necessitates placing the tie-rods B somewhat nearer together than usual, but the extra cost thereof is much more than compensated for by the greater stiffness and strength thereby imparted to the floors and by the large saving in cost of making the arches of cement concrete, as above described, which admits of their being constructed of considerably less thickness than if made of brick or tiling in the customary way.

Another material advantage of the above construction over the old is that the weight of the floor is greatly reduced by the use of the thin concrete arch over the said customary mode of construction without detracting from the carrying capacity or fireproof qualities of said floor. In fact, I find in practice that said carrying capacity is augmented rather than reduced by the use of arches made of concrete over the old method of construction, and it will at once be apparent to those skilled in the art of building construction that a floor thus made is, with the exception of the top wood flooring, absolutely fireproof.

In this instance the relative proportions of the various parts shown are fifteen inches for the depth of the beams A A and the same placed seven feet between centers. The tie-rods B are three-quarters of an inch in diameter and placed two feet between centers, and the cement concrete arch two inches thick,

the spring of the arch being, as will be observed by Fig. 1 of the drawings, from just above the bottom flanges of the beams to within about one-half inch of the under or lining floor D.

A cement concrete arch of the above thickness, span, and spring will in practice safely sustain a distributed load of six hundred pounds per square foot without crushing. Therefore, since a distributed load of only one hundred to three hundred pounds is required for an ordinary office building or warehouse, an arch of the construction herein described and shown might be considerably reduced in thickness and still safely sustain the load required for such buildings and for which my invention is more especially designed, although, of course, it may be applied for supporting any desired weight by increasing or decreasing the thickness of arch and making its supports to correspond therewith.

It will be observed by the drawings that the tie-rods B instead of extending in a straight level line from one beam to another are bent or inclined downward from and next to each beam to bring the top of the body of each rod about level with the bottoms of the beams. This is done for the purpose of forming a support for the metal lathing F on a level with the bottoms of said beams, and also to form a brace to support the plastered ceiling from sagging. By thus dropping the body of the tie-rods below the levels of their connections with the beams it will be apparent that in case of any spread of the arches C and beams A under a heavy load each tie-rod acts, in connection with the beams and arches, as a truss-rod, and the tendency will be to pull upward on the tie-rods, thereby always holding the ceiling in a taut level position, the greater such deflection being the greater will be the tendency to pull the ceiling up taut into the proper level position. This feature I believe to be new and is an important one in the practical application of my invention,

inasmuch as the slight deflection which is liable to occur in such flooring-arches and flooring is an advantage rather than a detriment to the proper support of the ceiling.

Concrete arches I find are particularly well adapted for the support of domes or similar spherical bodies where strength, combined with lightness of construction, is very desirable. This fact I have recently demonstrated in practice in the construction of a large dome for one of our public institutions.

I reserve the right to use the beams, tie-rods, and concrete arches alone or in conjunction with the fireproof ceiling construction described, as circumstances may require.

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

1. A fireproof floor comprising the supporting-beams and their transverse tie-rods, in combination with arches interposed between each pair of beams composed of cement concrete, the filling of mortar and broken bricks or similar material, above said arches, the wood flooring on top, the metal lathing placed over the tie-rods and under the beams, and the coatings of mortar above and below said metal lathing, substantially as set forth and shown.

2. In a fireproof floor, the combination of the supporting-beams, the tie-rods bent or inclined downward next to their connections with said beams to bring the body of each rod about upon a level with the bottoms of the beams, the metal lathing placed over said rods and under the beams, the plaster applied thereto above and below the same, the concrete arches extending from one beam to another, and the centers upon which said arches are built, substantially as and for the purpose set forth.

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Witnesses:

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