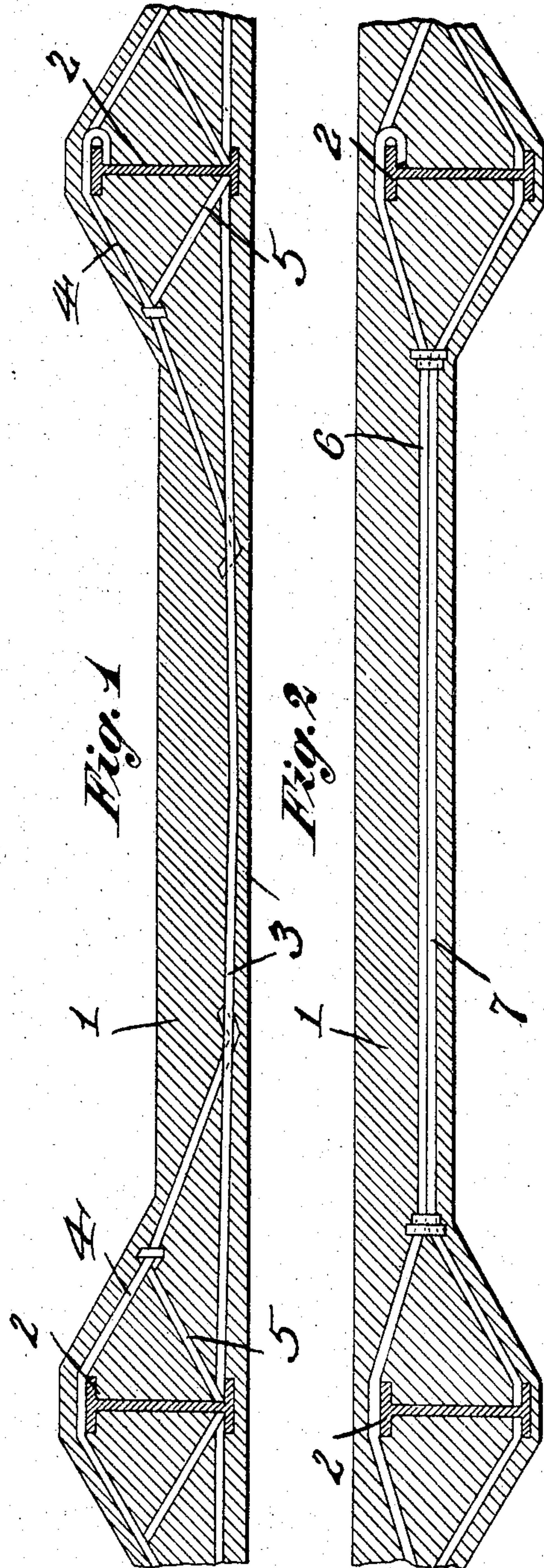


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J. F. KLEINE.
FIREPROOF FLOOR AND CEILING.
APPLICATION FILED SEPT. 25, 1903.



Witnesses:

Ethel C. Smith
F. M. Kuehn

Inventor

Joh. Franz Kleine

by Otto Mank

his Attorney

UNITED STATES PATENT OFFICE.

JOHANNES FRANZ KLEINE, OF BERLIN, GERMANY.

FIREPROOF FLOOR AND CEILING.

SPECIFICATION forming part of Letters Patent No. 780,566, dated January 24, 1905.

Application filed September 25, 1903. Serial No. 174,636.

To all whom it may concern:

Be it known that I, JOHANNES FRANZ KLEINE, architect, a citizen of the Kingdom of Prussia, residing at Lützow-Ufer 5^a, Berlin, Germany, have invented Improvements in Fireproof Floors and Ceilings, of which the following is a specification.

The present times require imperatively that fireproof floors of large span, slight weight, great strength and safety be constructed as cheaply as possible. The arrangement of metal stays or rods as heretofore embedded in such structures, according to which said stays extend from one beam to the other without any further support, is only able to meet the requirements of practice to a certain degree and require a correspondingly large amount of metal, so that the manufacturing is proportionately high. Moreover, their safety and durability easily suffer when the proportion of the thickness and span are unfavorable. By the present invention these drawbacks are avoided, and by using this invention cheap floors of great strength and safety and up to very large spans can be constructed. With this object metal stays or bars are embedded in the flooring in truss or cantaliver-like arrangement, metal bars of any suitable section, and particularly metal wires, being used for the purpose. The ends of these metal bars are connected either with the beams or to the brickwork or embedded in suitable manner in the neighboring floor. The struts are adapted to the special form of the floor, which is constructed in accordance with the particular requirements. The arrangement of such struts or supports, which in combination with the ties alone enables the technically-correct truss or cantaliver arrangement, is of the greatest importance in constructing solid floors of all kinds. Owing to the trusses or cantalivers of insured effect that part of the floor in which the stresses act most unfavorably is reduced to a fraction of the total span. By such means a quite considerable economy of metal and increased strength and safety of the floor are obtained, or, in other words, with the same weight of metal as heretofore necessary for smaller spans the free span of the floor can be ex-

tended very considerably, even to dimensions which much exceed the limits possible with the constructions heretofore known, the strength, safety, and durability being at the same time increased. The use of these excellent fireproof constructions will therefore be possible in a large number of important cases in which heretofore for structural reasons or on account of their high cost they could not be used in practice.

In the drawings two constructions according to the invention are represented by way of example.

Figure 1 shows one construction with a plane under surface, and Fig. 2 a construction with a coffered or arched under surface.

When for certain reasons it is considered advisable, the embedded metal stays or rods, especially in the middle portions of the floor, may be multiplied. Moreover, the dimensions or section of the metal stays or rods may vary in the separate parts. The described arrangement of the metal stays or rods remains, essentially, the same whether bricks, concrete, or bricks and concrete are used alternately in constructing the floor.

A suitable horizontal partition wall or floor is designated by 1, in which two beams 2 2, spaced a distance from each other, are embedded. Interposed between these beams is a strengthening-frame having a substantially truss cantaliver arrangement at opposite ends of the same in combination with the beam. The exemplification of this frame shown in Fig. 1 includes a major stay bar or member 3, extending between the beams 2 2 and connected to the upper ends of the latter by obliquely-extending stay members 4 4. Strut members 5 5 are interposed between the members 4 4 and the beams, being connected to the central portions of the former and finding bearings at their lower ends against the latter.

In the exemplification of my invention shown in Fig. 2 the major stay member is designated by 6 and is provided with end continuations serving the purposes of the members 4 in the form of the invention shown in Fig. 1. The strut members are also modified in that each pair is formed by the end portions of a single stay member 7.

What I claim, and desire to secure by Letters Patent, is—

1. The combination with the beams spaced a distance apart, of a frame including a member connected to the upper portions of the beams, and other members extending obliquely in relation to the beam connected to the first-named member and finding bearings at their ends against the side of the beam whereby
10 said frame is provided at its ends with substantially a truss cantaliver arrangement in combination with the beams.

2. The combination with a pair of beams embedded in a horizontal partition and spaced
15 a distance apart, of a stay-bar extending transversely in relation to said beams and between the same, a downwardly-extending member arranged adjacent to each beam and connecting the upper portions of the latter to the
20 stay-bar, and struts connected to the down-

wardly-extending member and finding bearings at their lower ends against the sides of the beams, substantially as described.

3. The combination with a pair of beams spaced a distance apart, of a frame including
25 a major rigid member, downwardly-extending rigid members connecting the first-named member to the top of the beam, and rigid strut members connected to the central portions of the downwardly-extending members
30 and finding bearings at the lower ends against the sides of the beams, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

JOHANNES FRANZ KLEINE.

Witnesses:

AUG. KOHLHASS,
GOTTFR. MOSER.