

Oct. 31, 1933.

J. G. SHRYOCK

1,933,394

FLOOR CONSTRUCTION

Filed Aug. 1, 1931

2 Sheets-Sheet 1

Fig. 1

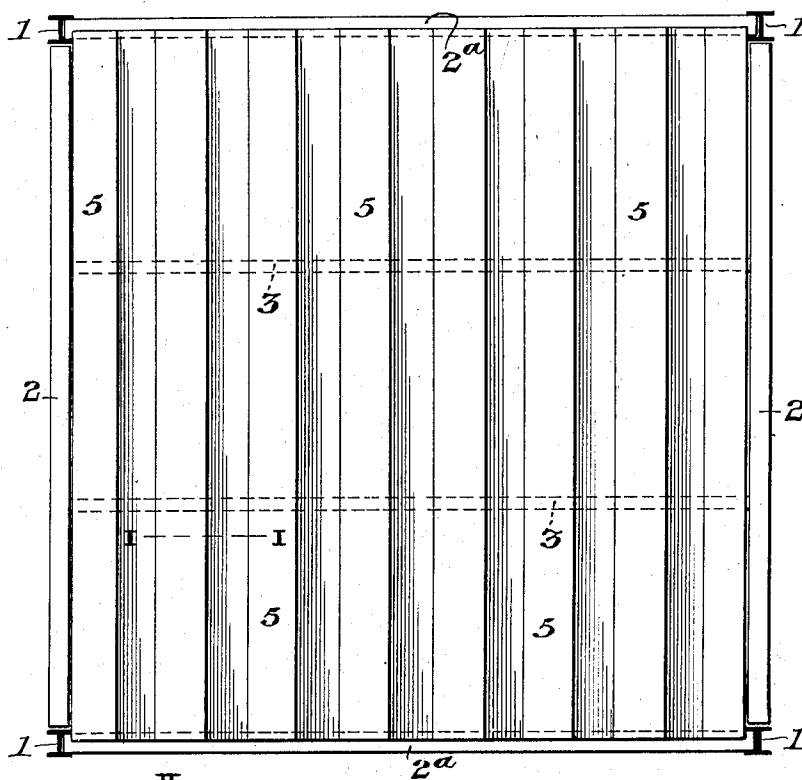


Fig. 2

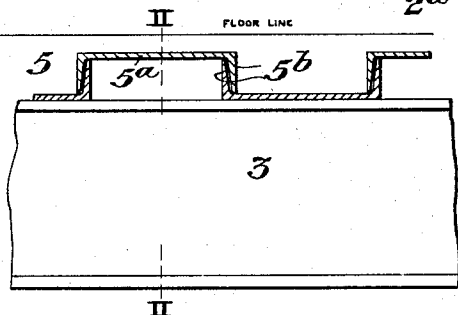


Fig. 3

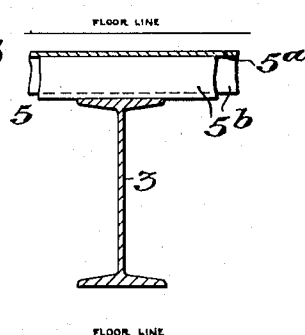


Fig. 4

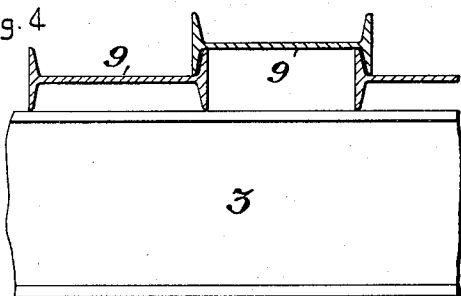
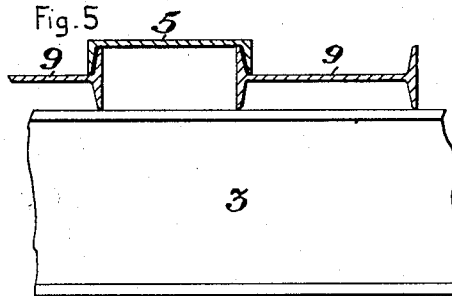


Fig. 5



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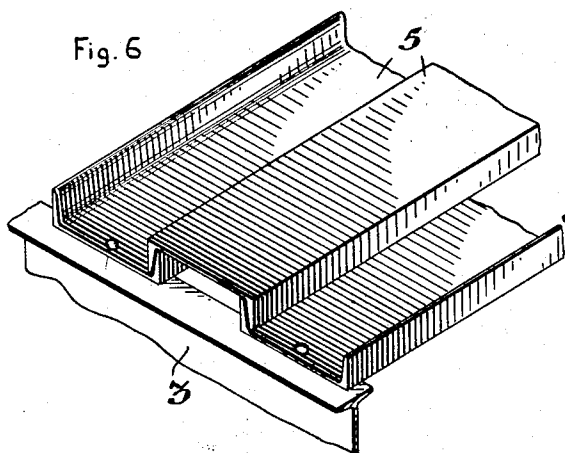
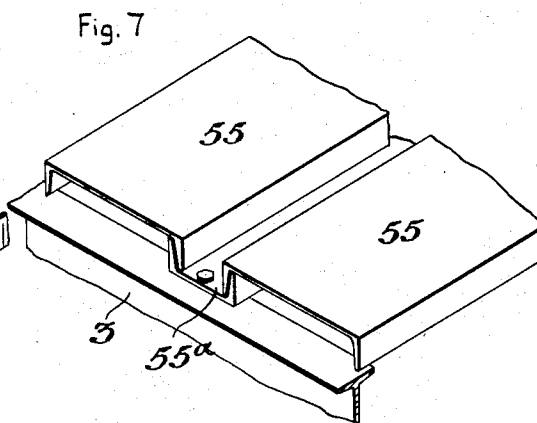
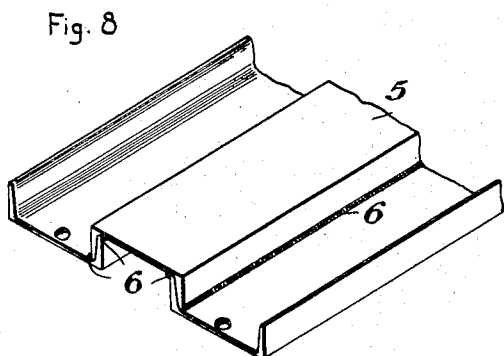
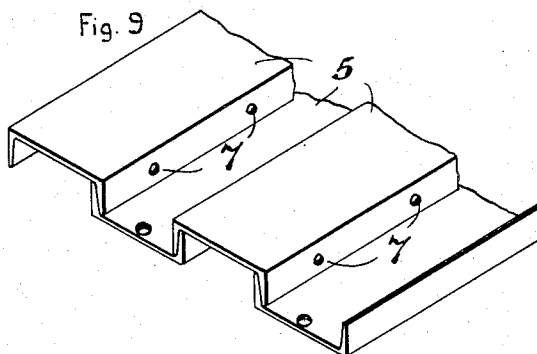
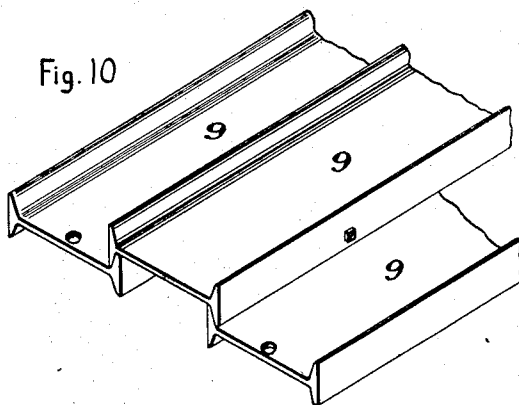
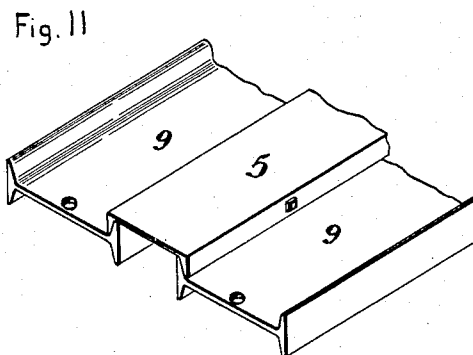
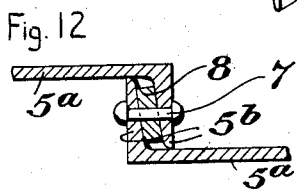
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

1,933,394

FLOOR CONSTRUCTION

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corporation of Pennsylvania

Application August 1, 1931. Serial No. 554,531

8 Claims. (Cl. 189—34)

My invention relates to building construction, more particularly the construction involving a metal frame or skeleton which is subsequently encased in walls, partitions, floors and roof. The object of my invention is to provide an improved floor construction for buildings of this type, which may be laid in any bay as soon as the beams and/or girders are in place and anchored to the columns.

My improved floor construction involves a main base or support of metal completely covering the entire area or space of the bays and available for use for all purposes during erection of the building frame-work. It thus takes the place of preliminary flooring of wood, usually employed before a final floor is constructed, with the distinct advantage that my improved floor is absolutely fire-proof.

My improved floor construction may be developed and employed in unit sections, or a plurality of units may be assembled in a fabricating shop before placement. The units may be connected together into sections of any suitable or convenient size before erection, or such units may be connected on the job. Such connection may be in the form of rivets, bolts, spot welding, or welded joints.

My improved floor structure may be made of standard structural shapes, or special rolled shapes as conditions may suggest or require. It possesses great structural stiffness with minimum deflection. In addition it provides great horizontal stiffness and resistance to wind strains.

My improved floor structure may be readily insulated against heat or cold, and completely sound-proofed. It is capable of directly supporting an absolutely fire-proof ceiling or a ceiling of the fire-resisting type. Its construction and arrangement provide for the reception of all forms of steam and/or hot water piping; electric conduits, and in addition it is admirably adapted for the reception of sleepers upon which floors of wood or composition may be laid.

My improved floor structure comprises standard structural elements such as light channel beams and/or the so-called "junior" beams laid in such relation that the beveled faces of the channel or beam flanges may be and preferably are in direct contact with each other and provide especially stiff longitudinal rib members. In the use of channel members, this condition is effected by employing the alternate channel members in trough condition, and inverting the intermediate channel members thereon. As noted, the abutting flanges may be welded, riveted,

or bolted together. They may be fabricated in sections in the shop and taken to the point of erection for immediate use, or the desired connection, of whatever nature employed, may be effected on the job. They may be left unconnected at suitable points for expansion and contraction during erection of a building, and finally connected together before the final floor is laid. Or the joint between adjacent flanges may include suitable interposed members serving as expansion elements. In all instances, such floor supporting members may be delivered in panel length for immediate use without the necessity of cutting. In all instances, the webs of the channel members or beams may be apertured as desired for the passage of steam and/or hot water pipes or mains.

A further feature of my invention resides in the fact that my improved floor members may be developed in exact mathematical dimensions and serve to maintain the frame-work in absolutely accurate shape in longitudinal and transverse directions. When the final floor is laid, which may be of any character desired; concrete of any type, gypsum, asphalt, terra-cotta, wood, and/or the like, the supporting elements comprising my improved floor construction may be finally anchored to the girders and/or beams. Preliminary to such final work, the floor members simply require temporary fastenings that will keep them in position to fully cover the area of the bays.

My improved floor structure thus provides all of the features of any preliminary flooring necessary when constructing buildings of extreme size and/or height; doing away with the usual temporary floors of wood, and avoiding entirely the fire risk attendant upon the use of floors of such type.

In addition to the employment of my improved floor construction with metal frame buildings and/or the like, it is equally applicable for use as a bridge floor or support upon which concrete, asphalt, or similar road material may be placed.

These and other features of my invention are more fully described hereinafter; reference being had to the accompanying drawings, in which:

Figure 1 is a plan view of a single bay of a structural metal building; showing the elements of my improved floor construction in place.

Fig. 2 is a sectional view on the line I—I, Fig. 1.

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Fig. 3 is a sectional view on the line II—II, Fig. 2.

Figs. 4 and 5 are end views illustrating modified floor structures within the scope of my invention.

Fig. 6 is a fragmentary perspective view of a portion of the floor structure illustrated in Fig. 1.

Fig. 7 is a similar view illustrating a modification within the scope of my invention.

Figs. 8, 9, 10 and 11, are perspective views, similar to Figs. 6 and 7, illustrating further details within the scope of my invention, and

Fig. 12 is a sectional view illustrating a detail of my invention.

In Fig. 1 of the drawings I have shown a plan view of a single bay of a steel framed building. The columns at the corners of such bay are indicated at 1 between which extend the major girders or beams indicated at 2 and 2^a, and "junior" beams, shown as extending between the girders 2, are indicated at 3.

Extending between the girders 2^a and overlying the junior beams I have provided a metal flooring made up of flanged elements, preferably channel members, indicated at 5. These channel members may be of any standard type and of light construction, or they may be of special construction. They comprise webs 5^a, and flanges 5^b; the flanges being of usual type with beveled inner surfaces joined to the webs by fillets and of material thickness at the corners. The outer walls of the flanges are at right angles to the plane of the webs and externally they present sharp corners. These channel members are placed in alternating relation upon the beams, that is to say, beginning with the first which may be laid with the web in uppermost position, the second will be reversed so that the web will rest on the beams with the flanges thereof underlying the web of the first section; the beveled surfaces of the respective flanges lying in contact and so on—each alternate channel member having its web upon the beams and the intermediate channel members having the webs uppermost.

The contacting flanges may be secured together in any approved manner as by welding, as indicated at 6 in Fig. 8; riveting as indicated at 7 in Fig. 9, or by bolting. If desired, with a view of providing for expansion and contraction during construction, suitable bodies of elastic or resilient material 8 may be interposed between the meeting flanges as indicated in Fig. 12.

The channel members making up my improved floor construction may be connected in sections comprising a plurality thereof and fabricated in the shop; being permanently joined together for assembly and connection with other similar sections on the job, or such channels may be laid singly and joined in any approved manner on the job. The channel members may be of various dimensions as may be necessary for special conditions and wide and narrow channels may be associated together as shown in Fig. 7; the wide channels being shown at 55 and the narrow channels at 55^a; the latter being arranged with their webs lying upon the beams.

By reason of the close association of the flanges and their permanent connection, the whole assembly presents a most rigid construction; such joined flanges providing longitudinal ribs of great strength and rigidity, and the floor structure so laid may receive final floor material of any nature, concrete, terra-cotta, gypsum, bricks, and/or the like. If wooden flooring is to be laid, the

channels in trough position may receive sleepers upon which such flooring may be placed.

Various arrangements of these channel members may be employed, some of which are indicated by the perspective views, Fig. 6, et seq.

In some instances, I may employ light beams 9 in developing my improved floor structure, as indicated in Fig. 4, or I may associate channel members 5 with these light beams, as indicated in Fig. 5.

By preference I employ channel members of light weight. They are of standard construction in all instances and while I may employ standard shapes and weights as found on the market, I may employ special sizes and weights; wide and narrow as the case may be, with flanges of the same contour and dimensions.

When erected on the job the channel or other members may be riveted or bolted to the beams or girders when laid, or temporary fastenings may be employed during construction of the building so that my improved metal flooring serves as a working floor during construction; producing a stiff and rugged non-deflecting support for all purposes and with absolute protection against fire, and permitting free use by workmen in the subsequent and successive building trades during completion of a building, bridge, or the like, without deformation or damage.

The spaces between flanges provide for the placement of steam and/or hot water piping, electric wiring and/or cables of all types, and form bonds or keys for any plastic body serving as the floor. From the channel members any form of supports may be suspended which may serve to carry fire-proof or fire-resisting ceilings, including the usual metallic lath which may be hung from such supports. Any necessary apertures for pipe or cable connections between floors may be cut through the webs of the channel member by any form of cutting tool or by flame—oxy-acetylene, electric torches, or the like.

My improved floor construction presents great flexibility of design in that the channel or other sections are always of a length to span the panel and by the use of channels or other sections of different widths the space of the panel transversely of the length of the channels may be completely filled. Any adjustment desired may be effected and if certain channels require spacing between flanges which would otherwise be in contact filler members may be employed.

In the use of my improved floor construction, employing light weight metal members upon which the final or service floor is supported, the total weight of the floor in any given structure is so greatly reduced as to permit the use of lighter columns and smaller foundations.

It will be understood that my improved floor construction is well adapted for use in constructing the floors of bridges in road and bridge construction; the flooring in such instance receiving and supporting a body of concrete, asphalt, or any other suitable road material.

While I have referred particularly to an improved floor construction available for buildings and bridges, it will be understood that my invention is equally applicable to roof construction. For such use I prefer to channel members of extreme width of web since, under usual conditions, a roof is only required to carry a nominal load.

I claim:

1. An inherently stable metal floor structure comprising a plurality of standard rolled channel members each composed of a web and flanges

normal to said web; said flanges having beveled inner faces and said channel members being arranged in interconnected relation with alternate channel members disposed in reverse position with respect to the directly adjacent members whereby adjacent flanges are brought into direct meeting relation with their beveled surfaces in continuous contact, and means for permanently connecting said contacting flanges with the alternate webs whereby a continuous inherently stable floor panel may be made from said rolled channel members.

2. An inherently stable metal floor structure comprising a plurality of standard rolled channel members each composed of a web and flanges normal to said web; said flanges having beveled inner faces and said channel members being arranged in interconnected relation with alternate channel members disposed in reverse position with respect to the directly adjacent members whereby adjacent flanges are brought into direct meeting relation with their beveled surfaces in continuous contact, means for permanently connecting said contacting flanges with the alternate webs whereby a continuous inherently stable floor panel may be made from said rolled channel members, and a traffic contacting surface overlying all of said channel members.

3. An inherently stable metal floor structure comprising a plurality of standard rolled channel members each composed of a web and side flanges normal to said web; said flanges having beveled inner faces and said channel members being arranged in interconnected relation with alternate channel members disposed in reverse position with respect to the directly adjacent channel members whereby adjacent flanges are brought into direct meeting relation with their beveled surfaces in continuous contact, and means for permanently connecting said contacting flanges whereby a continuous inherently stable floor panel may be made from said rolled channel members.

4. A metal floor structure composed of a plurality of standard rolled channel members each comprising a web and side flanges normal to said web; said flanges having beveled inner faces and said channel members being arranged in interconnected relation with the alternate channel members disposed in reverse position with respect to the directly adjacent channel members whereby the said adjacent flanges are brought into meeting relation with their beveled surfaces in continuous contact, and welded joints connecting the edges of said flanges with the webs of adjacent channel members whereby a continuous floor panel may be made from said channel members.

5. A metal floor structure comprising supporting means, a plurality of standard rolled channel members each composed of a web and side flanges normal to said web resting upon said supporting means; said flanges having inclined or beveled

internal faces and having greater thickness at the zone of engagement with their web than the wall of said web and said channel members being laid with the webs of alternate channels in contact with said supporting means whereby the flanges of adjacent channel members in alternately reversed relationship are brought into meeting relationship with their inclined or beveled surfaces in continuous contact throughout their length, and welded joints connecting the flanges of one member with the webs of the adjacent channel members whereby a continuous floor panel may be made from a plurality of said channel members.

6. A metal floor structure comprising supporting means, a plurality of standard rolled channel members each composed of a web and side flanges normal to said web resting upon said supporting means; said flanges having inclined or beveled internal faces and having greater thickness at the zone of engagement with their web than the wall of said web and said channel members being laid with the webs of alternate channels in contact with said supporting means whereby the flanges of adjacent channel members in alternately reversed relationship are brought into meeting relationship with their inclined or beveled surfaces in continuous contact throughout their length, welded joints connecting the flanges of one member with the webs of the adjacent channel members whereby a continuous floor panel may be made from a plurality of said channel members, and a traffic contacting surface overlying all of the members making up such floor panel.

7. An inherently stable metal floor structure comprising a plurality of standard rolled channel members each composed of a web and flanges normal to said web; said flanges having beveled inner faces and said channel members being arranged in interconnected relation whereby adjacent flanges are brought into direct meeting relation with their beveled surfaces in contact, and means for permanently connecting said interconnected and meeting flanges whereby a continuous inherently stable floor panel may be made from said rolled channel members.

8. An inherently stable metal floor structure comprising a plurality of standard rolled channel members each composed of a web and flanges normal to said web; said flanges having beveled inner faces and said channel members being arranged in interconnected relation with alternate channel members disposed in reverse position with respect to the directly adjacent members whereby adjacent flanges are brought into direct meeting relation with their beveled surfaces in contact, and means for permanently connecting said interconnected and meeting flanges whereby a continuous inherently stable floor panel may be made from said rolled channel members.

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