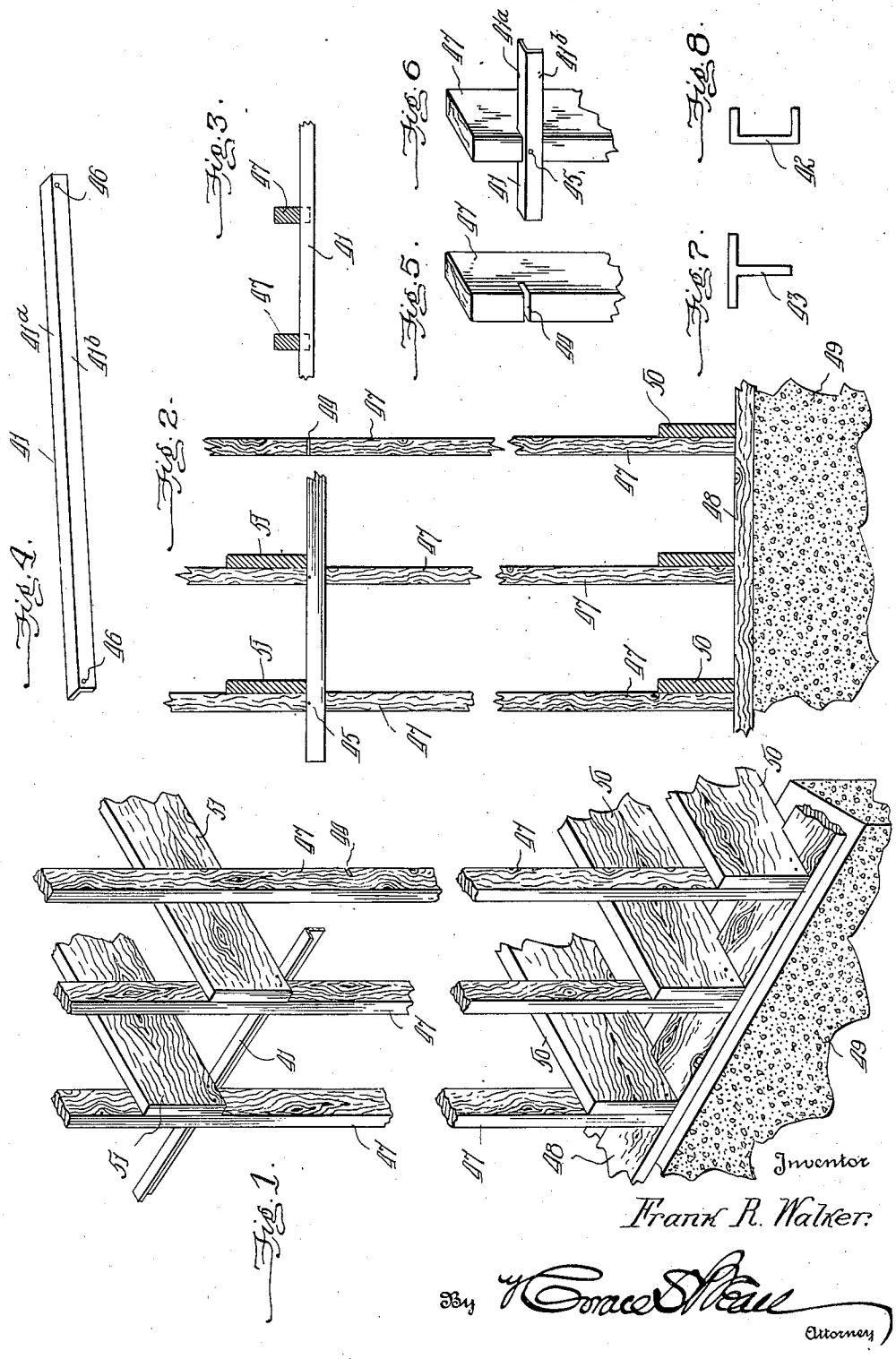
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METAL SUPPORT FOR WOODEN BUILDING CONSTRUCTION

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METAL SUPPORT FOR WOODEN BUILDING CONSTRUCTION

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Fig. 13.

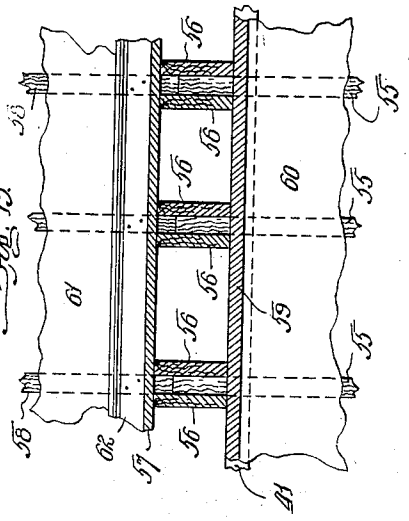


Fig. 14.

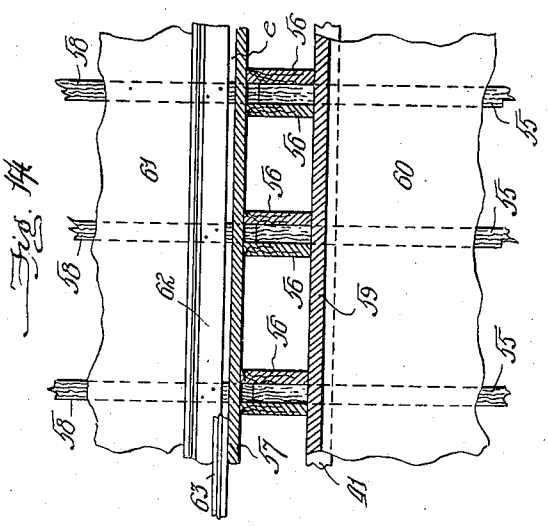


Fig. 10.

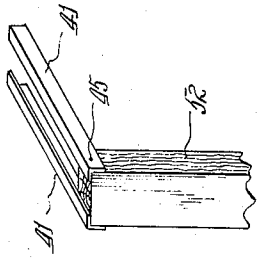


Fig. 11.

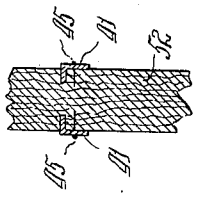


Fig. 12.

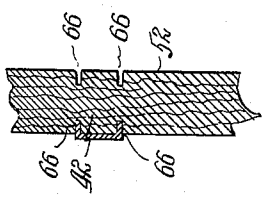
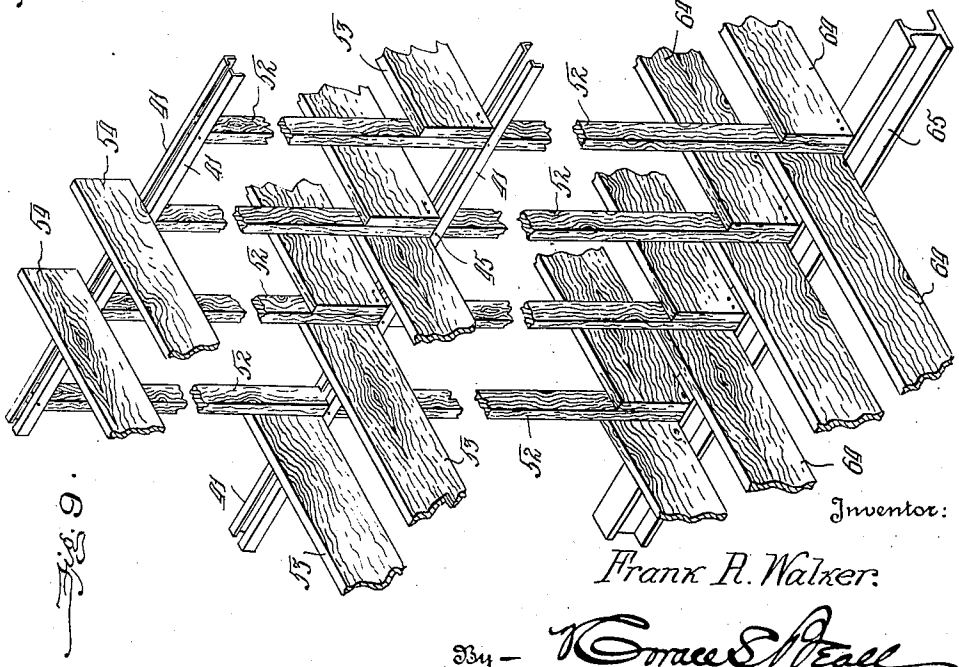


Fig. 9.



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METAL SUPPORT FOR WOODEN BUILDING CONSTRUCTIONS

Frank R. Walker, Glencoe, Ill.

Application July 3, 1936, Serial No. 88,870

5 Claims. (Cl. 20—94)

My invention is an improvement in wooden building construction, and relates more especially to the provision of metal supporting members adapted to cooperate with the wooden timbers for the erection of a more substantial structure.

It is well known that in wooden building construction the joists, beams, and other cross timbers supporting the floors and ceilings from the studding are subject to shrinkage which results in the settling of the structure, causing unsightly cracks to appear in the plastered walls and ceilings, as well as other structural defects such as sagging of the floors and the sticking of doors and windows.

Having in mind these defects which are associated with the usual construction of wooden buildings it is the main purpose of my invention to provide a metal supporting member or unit for the joists and like structural wooden elements employed in the erection of the building, whereby to maintain the joists or wooden elements at a definite height, thus stabilizing the ceiling line and at the same time bracing the building for greater wind resistance, without interfering with the shrinkage of the timbers which is compensated for in certain parts of the structure and in such manner as to retain the smooth appearance of the interior walls and ceilings.

The purposes of my invention are accomplished by the employment of non-shrinkable members in the form of metal strips or angle bars secured to the wood uprights or studding to support the wood joists or other timbers to which the floors and ceilings are attached, whereby shrinkage of said joists or timbers will be taken care of at the floor line in respect to each story of the building; the present invention being an improvement on that form of continuous metal ribbon incidentally disclosed in my prior Patent No. 2,042,370, dated May 26, 1936.

This invention therefore consists primarily in the provision of a nonshrinkable element or steel member in association with the wood uprights or studding constituting part of the framework of a building construction, in connection with the means of attachment to the studding, as hereinafter fully described and particularly set forth in the appended claims.

In the drawings, forming a part hereof:

Fig. 1 is a perspective view illustrating the application of my invention.

Fig. 2 is an elevation of Fig. 4.

Fig. 3 is a transverse sectional view on a line with the upper edge of the supporting unit.

Fig. 4 is a detail view of the supporting unit.

Figs. 5 and 6 are detail views showing the method of attaching the support to the studding.

Figs. 7 and 8 illustrate modifications of the supporting unit.

Fig. 9 is a perspective view showing the application of the supporting unit to partition studding.

Figs. 10 and 11 are sectional views showing the application of the supporting units to the upper end and intermediate portions respectively, of wood uprights or studding.

Fig. 12 is a similar view showing the application of a modified form of supporting unit.

Figs. 13 and 14 are sectional views through the flooring, ceiling and joists of a wooden building structure in accordance with my invention, in one instance (Fig. 13) before, and the other (Fig. 14) after shrinkage of the joists.

Like numerals of reference indicate like parts in all the figures of the drawings.

In the construction of frame buildings it is customary in some instances to support the studding on sill pieces which receive the ends of the joists, and in other instances to have the studding rest on supplemental sill pieces with the subflooring interposed between the sill and joists, the main sill pieces resting on a foundation wall in respect to the side walls, or an I-beam in supporting the partitions of the building. Furthermore, where the studding is extended beyond the second floor it is common practice to apply a wooden strip or ribbon inset on the face of the studding to support the second floor joists, while in the employment of comparatively short studs wood plates are interposed between the adjacent ends of said short studs and receive the second floor joists. This is a common construction, and where a wood strip or wood ribbon is used the shrinkage takes effect in both the top and bottom portions, with the result that the joists, secured to the studding, instead of resting on this wood strip or ribbon as originally intended, are suspended in mid-air, or slightly above the ribbon, thereby nullifying the effect of this wood ribbon as a support for the floor joists. In like manner this general construction is usually followed in a building having brick walls wherein the joists are tied into the wall at one end by metal tie plates and bear at the other end on a sill piece for the first floor and companion wood plates for the second and third floors, the wood plates being supported by studding resting upon auxiliary sill pieces mounted directly on the inner lapped ends of the joists

or on sub-flooring interposed between said sill pieces and joists. These prevailing methods of construction are faulty in the respect that the shrinkage of the joists results in the settling of the walls in frame buildings and the partitions in both frame and brick buildings causing very objectionable defects such as cracking of the walls and ceilings as well as sagging of the floors, windows, and door frames, which not only make an unsightly appearance but also distort the frames of the windows and doors to such an extent as to affect operation, that is cause the doors to drag on the floor or door sills and the windows to stick.

I have discovered that the damaging effect due to the settling of wooden building structures of the general character briefly described can be eliminated by supporting the joists for the floors and ceilings on crosspieces of metal or other nonshrinkable material attached to the joists, an example of which is the basis of my aforementioned patent, it being understood there is no shrinking of the studding longitudinally and that in the employment of metal supports in accordance with my invention the joists will be maintained at the original height irrespective of the shrinking of said joists, and that as the usual shrinkage in the present instance only affects the height of the upper edges of the joists there is only a corresponding settling of the flooring to the extent of the shrinkage of the joists on which the separate floors are supported—there being no settling of the building structure in respect to the ceilings. That is to say, as a consequence of this construction the walls and ceilings are maintained in their original condition, and the metal supports in addition to overcoming the injurious settling of wooden buildings serve to thoroughly brace the walls and partitions for a more substantial construction including a maximum resistance to wind pressure.

In carrying out my invention with particular reference to the construction forming the subject-matter of this application the nonshrinkable support comprises a member or metal strip **41**, preferably in the form of an angle-bar as shown in the principal views of the drawings, although it may be a channel-bar **42** (Fig. 8), a T-shape bar **43** (Fig. 7), or any other shape in cross-section suggested in the light of my disclosure, it being essential only that the member comprise an attaching element or flange to securely engage the studding in the manner hereinafter set forth.

The angle bar **41** is preferred for economy in construction and facility in application, and for attachment of the angle-bar to the wood upright or studding one of its flanges **41a**, referred to herein as the attaching flange, may be shorter than the other or bracing flange **41b**, the said attaching flange serving not only to secure the member to the studding but also as a seat or support on which the joists rest. The nonshrinkable supporting member may be attached to the studding intermediate the ends thereof, to support joists for intermediate floors, and on the upper ends thereof where the studding terminates at a floor line, such application of the supporting members being illustrated in Fig. 9 of the drawings; in the former instance the attaching flange engaging a saw cut or kerf **44** in the studding, and in the latter instance said attaching flange of the supporting member resting directly on top of the studding. In cutting the saw-kerf it should approximate the thickness of the attaching flange so that a snug fit is provided, for inasmuch as the strain is downward in supporting the joists the driving of nails **45** through the depending flange *41b* into the studding is merely for holding the supporting member in place. In securing the supporting members or flanged metal strips in place on the studding—to the sides or top as the case may be—the nails are driven directly through the depending flange to hold the latter against the face of the wood stud, and in fabricating the metal member it is provided with holes **46**, (see Fig. 4) to receive the nails or attaching means, the holes being punched or drilled in the flange according to the standard spacing of studding, 12, 16, or 24 inches apart, although in practice nail holes at each end of the member should be sufficient to hold it in place. When the joists are set on the supporting members, against one or both sides of the studding, they are attached to the studding by driving the nails through the joists near the lower edges thereof, as indicated in Fig. 1 of the drawings, to permit, or not interfere with, the shrinkage of the upper part of the joists.

As the supporting members or metal strips function to support the joists and flooring, as well as any normal load to be carried thereby according to the prospective use of the building structure, the said supporting members are preferably made of steel, and although they may be furnished in any length desired it is my intention to supply them to the trade in 4-foot lengths or multiples thereof.

Explaining briefly the application of my invention as shown in the several figures of the drawings, it will be seen that in Figs. 1 and 2, where the studding extends beyond the second floor from sill plate **48**, resting on foundation **49**, in supporting the joists **50**, the supporting member or metal strip is attached to the inner edge of the studding to support joists **51**, which receive the flooring of the second story of the building and ceiling of the first story, and that Fig. 9 shows the metal supporting members or strips applied to the upper ends of the studding **52** to support the joists **54** for the ceiling of the second story, as well as intermediate the ends of the studding to support the second floor joists **53**, but where short or one story studding is used the supporting members or metal strips are mounted on top of the first story studding, and the second story studding stepped on top of said supporting members or metal strips. In Figs. 13 and 14, I have illustrated another application of the metal strips in that form of framing construction for wooden buildings where short studding is used, in this instance the studding **55**, for the first story terminating a short distance above the supporting member, or between the joists **56** to which the flooring **57** for the second floor is attached, the studding **58**, for the second story being stepped directly on the first story studding. These last mentioned figures of the drawings (Figs. 13 and 14) also include the ceiling **59** of the first story, the side walls **60** and **61** of the first and second stories respectively, as well as the baseboard **62** at the bottom of the side wall **60**—Fig. 13 showing the construction before shrinkage of the joists, and Fig. 14 after shrinkage—from which it will be noted that the only result is a gap, designated by the letter *e*, left between the baseboard attached to the studding and the flooring attached to the joists as the flooring follows the shrinking of the joists downward. This gap is the only indication in the structure of the shrinkage of the joists, the ceil-

ings remaining at their original heights due to the nonshrinkage of the joist supporting members and the nonshrinkage of the studding longitudinally, that is in the direction of their length. The gap which will be formed between the baseboard and flooring is rather insignificant, as compared with the usual cracking of side walls and ceilings, especially at the intersections, but even this open joint will be covered by the shoe 63 being attached to the flooring to follow it downward.

As illustrated in Fig. 1 the first floor joists rest on a wood sill of the required thickness, and this sill will have only a minimum degree of shrinkage with little or no effect on the settling of the superstructure; while in Fig. 9 the studding and first floor joists (64) are supported on a metal I-beam 65 from which the partitions of the building rise to eliminate even the slight shrinkage which may result from the use of a wood sill.

In the use of the modified form of supporting member shown in Fig. 7 one of the outwardly projecting flanges of the T-shape bar will function as an attaching flange in the same manner as the attaching member of the angle-bar, or preferred form, while in the modification shown in Fig. 8 the spaced apart flanges of the channel bar will provide a double bearing on the stud with the vertical portion bearing against the inner or outer face of the studding according to the location of the supporting member. In the application of this modified form of supporting member two saw-kerfs, 66, 66, will be cut in the stud when said member is located intermediate the ends of the stud, and a single saw-kerf provided near the upper end of the stud when the supporting member has a bearing on the upper end of the stud, as will be understood.

From the foregoing description in connection with the accompanying drawings the effectiveness of my invention in overcoming the damaging effect from the shrinkage of wood timbers in the construction of a wooden building will be readily appreciated by those skilled in the art of constructing wooden buildings, and it will be understood that in addition to supporting joists the non-shrinkable members or metal strips of the character generally described herein may be employed for other timbers used in a building, as for instance rafters, stringers, etc., and consequently I reserve the right to any changes or application of my invention within the spirit and scope of the appended claims.

I claim:

1. In combination with the studding and joists of a frame building construction, of means for overcoming the damaging effect coincident to shrinkage comprising saw-kerfs across the face of the studs at the approximate elevation of the joists, and a flanged metal strip for supporting the joists in association with the studding, said flanged strip being continuous from stud to stud, the flange of the metal strip extending into the kerfs in the studs and the body portion of the strip bearing against the face of the studding, whereby the supporting flange of the metal strip has a bearing at the bottom of the kerf to firmly support the metal strip and joists in connection with the studding.

2. In combination with the studding and joists of a frame building construction, of means for overcoming the damaging effect coincident to shrinkage comprising saw-kerfs across the face of the studs at the approximate elevation of the joists, and a flanged metal strip for supporting the joists in association with the studding, said flanged strip being continuous from stud to stud, the flange of the metal strip extending into the kerfs in the studs and the body portion of the strip bearing against the face of the studding, whereby the supporting flange of the metal strip has a bearing at the bottom of the kerf to firmly support the metal strip and joists in connection with the studding; together with means, as nails passing through holes in the strip, for securing said strip in place.

3. In combination with the studding and joists of a frame building construction, of means for overcoming the damaging effect coincident to shrinkage comprising saw-kerfs across the face of the studs at the approximate elevation of the joists, an angle bar for supporting the joists in association with the studding, said angle bar being continuous from stud to stud, one member of the angle bar extending into the kerfs in the studs and the other member bearing against the face of the studding, and means for securing the angle bar in place, whereby the member of the angle bar bearing in the kerfs in the studs at the bottom of said kerfs firmly supports said angle bar and joists against downward movement with respect to the studding.

4. In combination with the studding and joists of a frame building construction, of means for overcoming the damaging effect coincident to shrinkage comprising spaced apart saw-kerfs across the face of the studs at the approximate elevation of the joists, a channel bar for supporting the joists in association with the studding, said angle bar being continuous from stud to stud, the spaced apart flanges of the channel bar extending into the saw-kerfs to bear on the studs at the bottom of said saw-kerfs and the intermediate portion of the channel bar bearing against the faces of the studs, and means for securing the channel bar in place, whereby the engaging flanges of the channel bar will firmly support the channel bar and joists against downward movement with respect to the studding.

5. In combination with the studding and joists of a frame building construction, of means for overcoming the damaging effect coincident to shrinkage comprising saw kerfs across the face of the studs at the approximate elevation of the joists, a T-bar for supporting the joists in association with the studding, said T-bar being continuous from stud to stud and one of the lateral flanges thereof forming a supporting flange extending into the saw kerfs in the studs with the vertical member of the T-bar bearing against the face of the studding, whereby the supporting flange has a bearing at the bottom of the kerf to firmly support the T-bar and joists in connection with the studding.

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