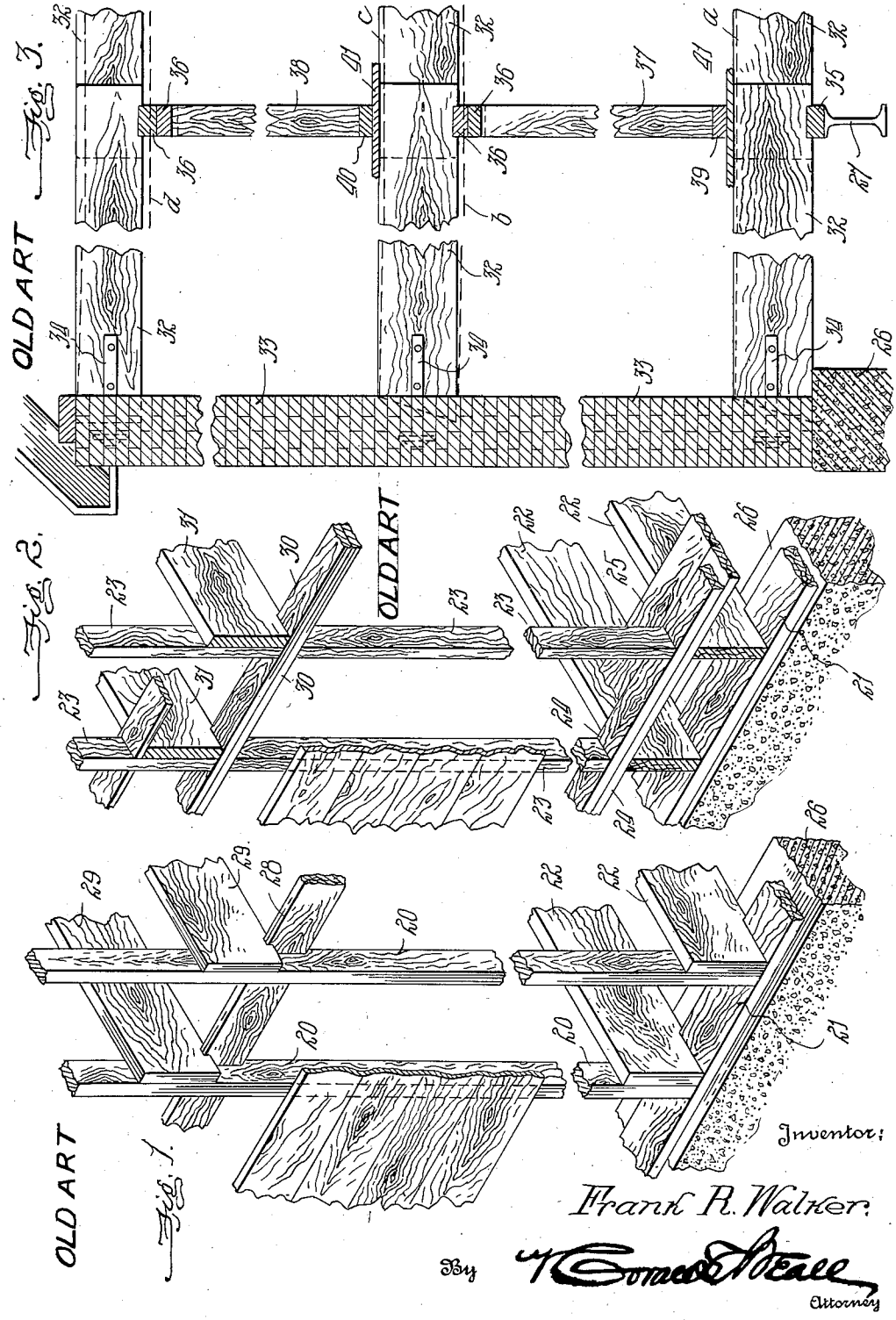
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METAL SUPPORT FOR WOODEN BUILDING CONSTRUCTION

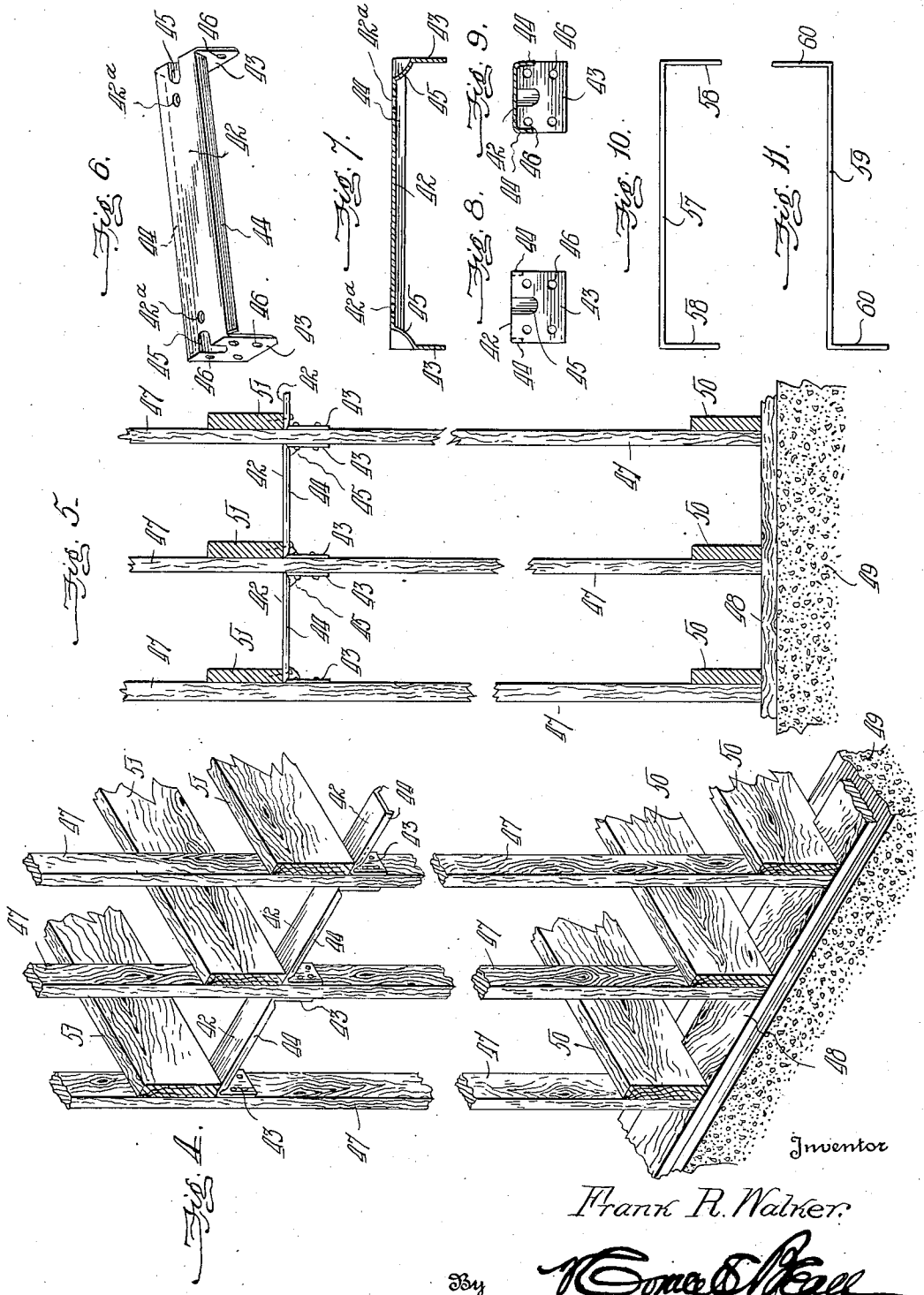
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METAL SUPPORT FOR WOODEN BUILDING CONSTRUCTION

Filed Dec. 12, 1934 3 Sheets-Sheet 2



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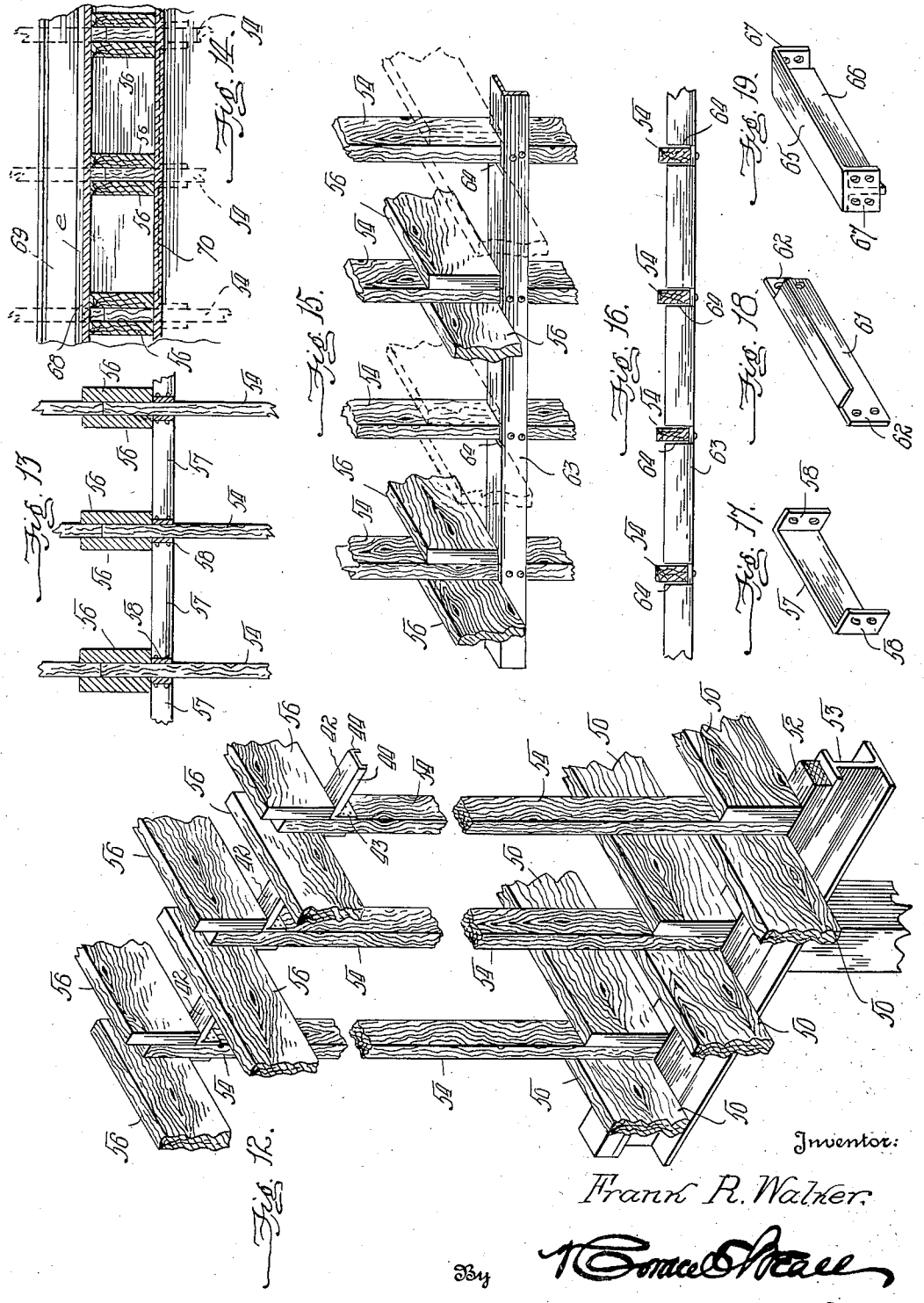
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METAL SUPPORT FOR WOODEN BUILDING CONSTRUCTION

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METAL SUPPORT FOR WOODEN BUILDING CONSTRUCTION

Frank R. Walker, Glencoe, Ill.

Application December 12, 1934, Serial No. 757,221

6 Claims. (Cl. 20—1)

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 joist or wooden element at a definite height, thus stabilizing the ceiling line and at the same time brace the building for greater wind resistance, without interfering with the usual 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 present invention are accomplished by including in the wooden building construction metal plates of substantial construction located between the uprights or studs and secured thereto for the purpose of supporting the joists or other wooden timbers to which the floors and ceilings are attached so that shrinkage of said joists or timbers will be taken care of at the floor line in respect to each story of the building, all as hereinafter fully described and especially referred to in the appended claims.

In the drawings:

Figures 1 and 2 are perspective views of portions of a wooden building structure, showing the usual method of construction.

Fig. 3 is a sectional view, the shrinkage of the wooden joists being indicated in dotted lines.

Fig. 4 is a perspective view illustrating the application of my invention.

Fig. 5 is an elevation of Fig. 4.

Figs. 6, 7, 8, and 9 are detail views of the preferred form of construction of the metal supporting member in accordance with my invention.

Figs. 10 and 11 are modifications in the formation of the metal supporting member.

Fig. 12 is a perspective view showing the application of my invention to that part of a wooden building construction forming a partition.

Fig. 13 is a sectional view showing a further modification of the metal supporting member for the joists.

Fig. 14 is a sectional view illustrating the effect of the shrinkage of the joists.

Figs. 15 and 16 are perspective and plan views showing a modification in which the metal supporting member is in the form of a continuous plate connecting the several studs.

Figs. 17, 18, and 19 are detail views of additional modifications.

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 **20** on sill pieces **21** which receive the ends of the joists **22**, as illustrated in Fig. 1, and in other instances to have the studding **23** (Fig. 2) rest on supplemental sill pieces **24** with the rough flooring **25** interposed between the sill and joists, the main sill pieces resting on a foundation wall **26** in respect to the side walls, or an I-beam **27** for supporting the partitions of the building. Furthermore, where the studding is extended beyond the second floor (Fig. 1) a wooden strip or ribbon **28** is inset on the face of the studding to support the second floor joists **29** (Fig. 1), while in the employment of the comparatively short studs **23**, **23** (Fig. 2) wood plates **30**, **30** are interposed between the adjacent ends of said short studs and receive the second floor joists **31**. Where wood ribbon is used the shrinkage action takes effect in both the top and bottom portions, with the result that the joists, secured to the studding, instead of resting on this ribbon as originally intended, are suspended in mid-air, or slightly above the ribbon, thereby causing the effect of this wood ribbon to be lost as a support for the floor joists. In like manner this general construction is usually followed in a building construction having brick walls, as shown in Fig. 3, wherein the joists 32, 32 tied into the wall **33** at one end by metal tie plates **34** bear at the other end on a sill piece **35** for the first floor and companion wood plates **36**, **36** for the second and third floors, the wood plates being supported by studding **37**, **38** resting upon auxiliary sill pieces **39** and **40** mounted directly on the inner lapped ends of the joists or on rough flooring **41** 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, window 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 the operation of the latter, that is causing the doors to drag on the floor or door sills and the windows to stick.

By reference to Fig. 3 of the drawings the dotted lines *a*, *b*, *c*, and *d* indicate the shrinkage action of the joists and plates at the point where partitions are located, but it will be understood of course that a similar effect results from the usual construction of the outside walls of frame buildings, illustrated in Figs. 1 and 2. In other words, the shrinkage of the first floor joists, indicated by the dotted line *a* is followed down by the studding **37** which permits sagging of the wood plates **36**, as at *b*, and the shrinking of the second floor joists and plates, indicated by *c*, is likewise followed down by the studding of the second floor, lowering the wood plates supported at the upper ends of this studding, thus lowering the height of the joists to which the second floor ceiling is attached. Of course there is an uneven shrinking in the building construction evidenced by cracks in the plaster at wall and ceiling intersections and in corners of the vertical walls, the degree of settling being greater at the ceiling of the second floor than at the ceiling of the first floor for the reason that it is affected by the shrinkage of the first and second floor joists and plates, while the settling of the first floor ceiling is the result of the shrinkage of the first floor joists and sill pieces only.

I have discovered that the settling of wooden building structures of the general character hereinbefore described can be eliminated by supporting the joists for the floorings and ceilings on crosspieces of metal or other non-shrinkable material located between the studs and secured at their ends thereto, it being understood there is no shrinking of the stud longitudinally, whereby the joists are maintained at the original or definite height irrespective of the shrinkage of said joists, and as the usual shrinkage in this instance only affects the height of the upper edge of the joist there is merely a slight settling of the flooring and to the extent only of the shrinkage of the joists on which the separate floors are supported, no settling of the building structure occurring in respect to the ceilings. As a consequence of this construction the walls and partitions are maintained in their original condition, and in addition to the metal supports overcoming the objectionable settling of the structure which is detrimental to the interior finish, as regards the plastered walls, window and door frames, mantles, etc., they serve to thoroughly brace the walls and partitions for a more substantial building construction that will offer a maximum of wind resistance.

The metal or non-shrinkable supporting members in accordance with my invention may be made in various shapes in cross-section, that shown more clearly in the detail views **6** to **9** being in the form of a plate **42** with attaching members **43**, **43** at its ends by which said member is secured to the studs, and for the purpose of bracing the plate as well as provide bearings for the joists, the opposite longitudinal edges are turned to provide flanges **44**, **44**, and to further strengthen the plate it is stamped inwardly where the attaching members join the body of the plate to provide curved ribs **45**. As will be noted by reference to Fig. 6 the depending end members of the plate are provided with holes **46** through which nails or other securing means are driven into the stud, and the body of the plate provided with holes **42***a* near its ends through which nails are driven into the joist. In Figs. 4 and 5 I have shown this particular form of metal supporting member applied to an outer wall structure in which the long studs **47**, **47** rise from a sill piece **48** resting on the foundation wall **49** and supporting the first floor joists **50**, with the metal supporting members **42** secured between said studs to support the second floor joists **51**; while in Fig. 12 my invention is shown applied to a partition construction in which the sill piece **52** supported on an I-beam **53** supports the studs **54** extending to the second floor only and between the upper ends of which the metal supports are secured to receive the second floor joists **56**, this arrangement being carried out in respect to the third floor joists and so on according to the height of the building.

Although the formation of the supporting member as hereinbefore described is the preferred construction, it will be understood that the same results in the more substantial construction of a frame structure may be obtained by modifying the shape of the member; for instance in Figs. 10, 13, and 17 I have shown a straight plate **57** with attaching members **58**, **58**, projecting in the same direction, and in Fig. 11 a similar plate **59** is employed having the attaching members **60**, **60** extending in opposite directions.

In the form shown in Fig. 18 I employ an angle plate **61** with the vertical member thereof extended beyond the ends of the horizontal member, as at **62**, **62**, and provided with holes for attachment of the angle plate to the face of the studs, while in Figs. 15 and 16 a long angle plate **63** is employed and the horizontal member on which the joists rest cut away, as at **64**, to receive the studs to which it is attached, in this instance the angle plate bridges a plurality of studs for convenience in application and greater rigidity.

As a still further modification in the shape of the metal supporting member for the purpose of carrying out my invention I have shown in Fig. 19 a T-shape plate **65** in which the strengthening rib **66** is cut away at its ends so that the end portions of the plate may be bent to provide the attaching flanges **67**, **67**.

Any of the different forms of supporting members may be applied flat or on edge, that is to say as the purpose of these metal supports or structural units is to firmly support the joists or like timbers at predetermined height in the building structure they may be applied between the studding according to the desire of the builder, and being simple and cheap in construction they are more economical than the ordinary wood ribbons which require notching of the studding, as well as provide a more substantial construction by not requiring the studs to be weakened by notches. The use of the metal supporting members also eliminates the necessity of sizing joists to an exact width inasmuch as the top line of the joists is set at a height to conform to the floor level, and any unevenness in the width of the joist is absorbed at the ceiling line. After the floor joists are set at the proper height the metal support is adjusted against the underside of the wood joists and secured in place, thereby permanently supporting said joists at a definite or predetermined height, and there being no shrinkage action in said metal support the joists will not drop to a lower level; that is to say, when shrink-

age action does take place the bottom of the joist can go no lower than the metal joist support on which it rests, so that all shrinkage action must be absorbed at the upper portion of the joist on which the flooring rests which is concealed by the wood base shoe. This is illustrated in Fig. 14 of the drawings, where it will be seen that the shrinkage of the joists on which the flooring **68** is placed lowers this flooring to the extent of the shrinkage, indicated by the letter *e*, resulting in merely leaving a gap between the flooring and wood base shoe **69**, when the shoe is nailed to the baseboard, but the formation of a gap may be easily overcome by nailing the wood base shoe into the wood floor instead of into the baseboard, so that when the joists shrink the base shoe being nailed into the floor drops a distance equal to the shrinkage of the joists, thus eliminating an unsightly crack at the floor line. In either instance the height of the ceiling **70** is not affected, and consequently there is no settling of the building construction between the floors and ceilings of any of the several stories of the building.

The metal supporting member or device for carrying out my invention can be made in any size to fit different spacing of studs and may be secured to the studs by means of nails, screws, bolts, or other attaching means, and although I have illustrated numerous modifications I desire it to be understood that other modifications in the design of the metal supporting member may be adopted within the spirit and scope of the claims.

I claim:

1. A timber supporting unit for the studding and joists of a frame construction to overcome the damaging effect coincident with the shinking of the joists, said supporting unit comprising a non-shrinkable member of a length corresponding with the space between studding, and attaching flanges at the ends of said member for securing the same to the studding in supporting the joists at a definite or predetermined height.

2. A joist supporting unit for the studding and joists of a frame construction to overcome the damaging effect coincident with the shrinking of the joists, said joist supporting unit comprising a non-shrinkable plate of a length corresponding to the space between the studding, reinforcing flanges at the longitudinal edges of the plate, and attaching flanges at the ends of said plate for securing the same to the studding.

3. A joist supporting unit for the studding and joists of a frame construction to overcome the damaging effect coincident with the shrinking of the joists, said joist supporting unit comprising a channel plate extending between the studding and having attaching flanges at its ends for securing the same to the studding in supporting the joists at a definite or predetermined height.

4. A joist supporting unit for the studding and joists of a frame construction to overcome the damaging effect coincident with the shrinking of the joists, said joist supporting unit comprising a metal angle bar having attaching flanges at its ends for securing the same to the studding in supporting the joists at a definite or predetermined height.

5. A joist supporting unit for the studding and joists of a frame construction to overcome the damaging effect coincident with the shrinking of the joists, said joist supporting unit comprising a T-shaped metal plate having attaching flanges at its ends for securing the same to the studding in supporting the joists at a definite or predetermined height.

6. In combination with a wooden building construction including studding and joists, of a support for maintaining the joists at a definite or predetermined height comprising a metal plate having longitudinal reinforcing flanges, and end flanges bent at an angle to the plate for attaching the same to the studding.

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