United States Patent [19]

Lear

[11] **3,831,329**

[45] **Aug. 27, 1974**

[54] **BUILDING CONSTRUCTION SYSTEM**

[75] Inventor: **Donald S. Lear**, Concord, Calif.

[73] Assignee: **Glen-Crete Products Co.**, Pleasant Hill, Calif.

[22] Filed: **Dec. 30, 1970**

[21] Appl. No.: **102,940**

Related U.S. Application Data

[63] Continuation of Ser. No. 799,297, Feb. 14, 1969, abandoned.

[52] **U.S. Cl.** ..... **52/126,** 52/296, 248/354 S

[51] **Int. Cl.** **E04c 15/00**

[58] **Field of Search** ..... 52/122, 126, 296, 365, 52/370; 248/354 S

[56] **References Cited**

UNITED STATES PATENTS

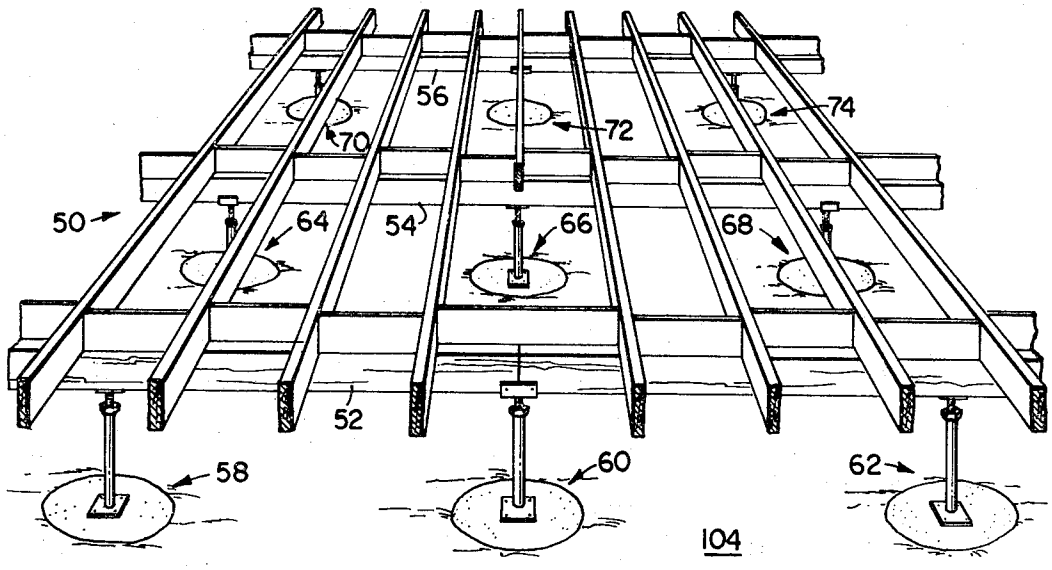
960,207	5/1910	Slater	52/90
1,751,785	3/1930	Aubrey	52/370
2,138,958	12/1938	Corbett et al.	52/122
2,850,254	9/1958	Houseworth	248/354 S
3,000,145	9/1961	Fine	52/365
3,067,843	12/1962	Rushton et al.	52/126
3,222,030	12/1965	Thorpe	52/122
3,420,012	1/1969	Liskey	52/126

Primary Examiner—Henry C. Sutherland
Attorney, Agent, or Firm—Phillips, Moore, Weissenberger, Lempio & Strabala

[57] **ABSTRACT**

Steel piers are fixed to concrete footings supported by the ground. These piers extend upward from the footings to support the girders of the frame of a house. The piers are adjustable in height so that they may be set to support the girders at proper distance above the ground. Each pier includes a top plate which is nailed to the supported girder. Each pier may be easily adjusted, if necessary, to compensate for subsequent heaving of the ground by readjusting the height of the pier. Selective locking of the adjusting mechanism against accidental retraction by vibration is provided without impeding extensibility under heaving stress.

9 Claims, 8 Drawing Figures



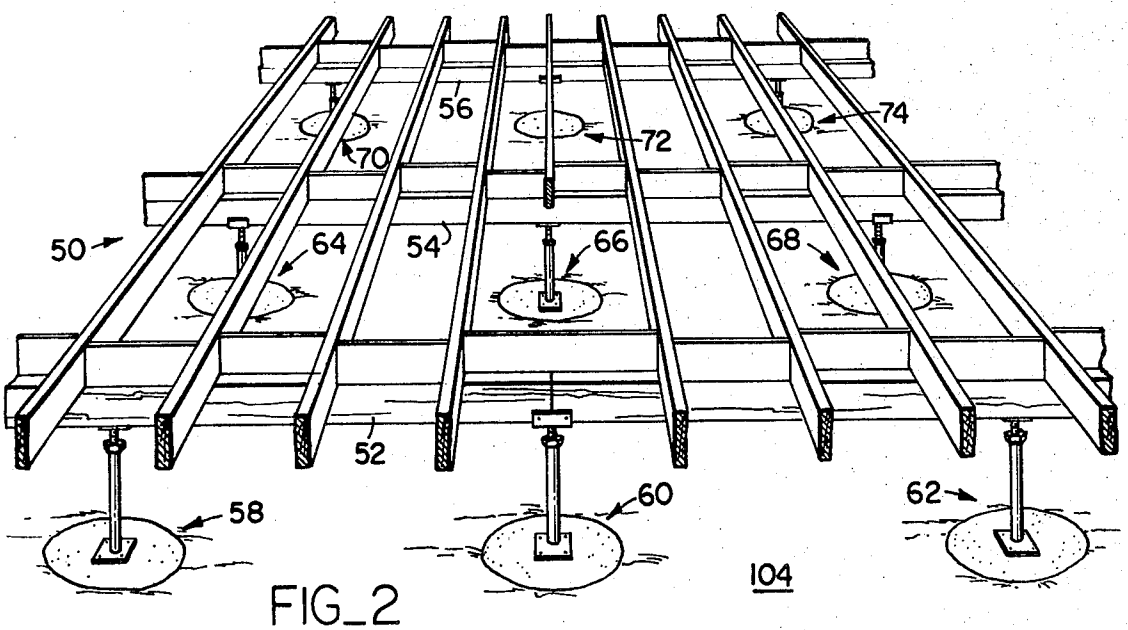
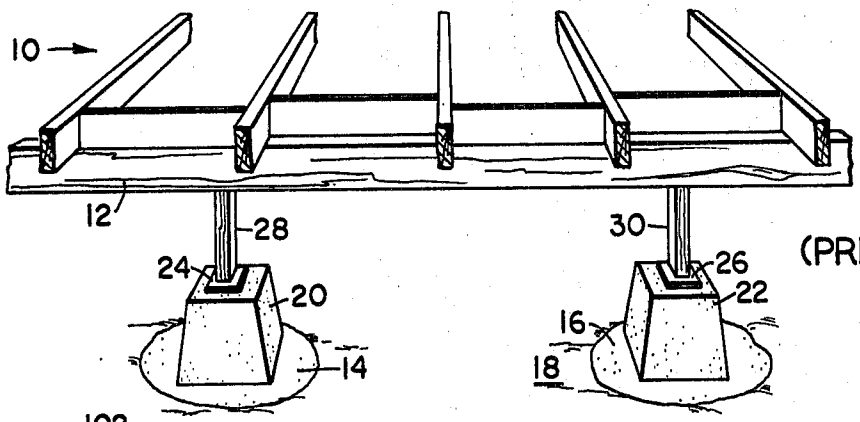


FIG_2



(PRIOR ART)

FIG_1

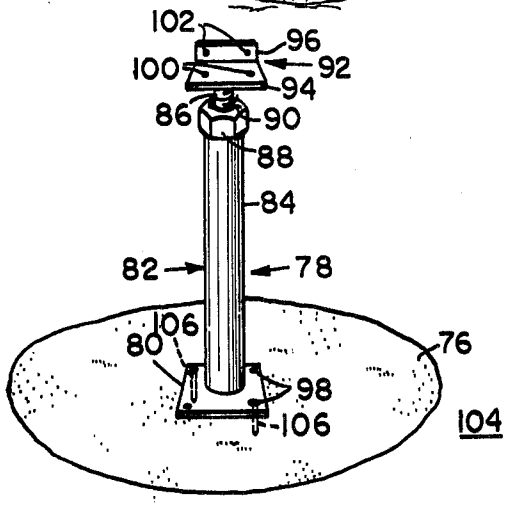


FIG_3

INVENTOR.
DONALD S. LEAR

BY

Mellin, Moore & Weissenberger

ATTORNEYS

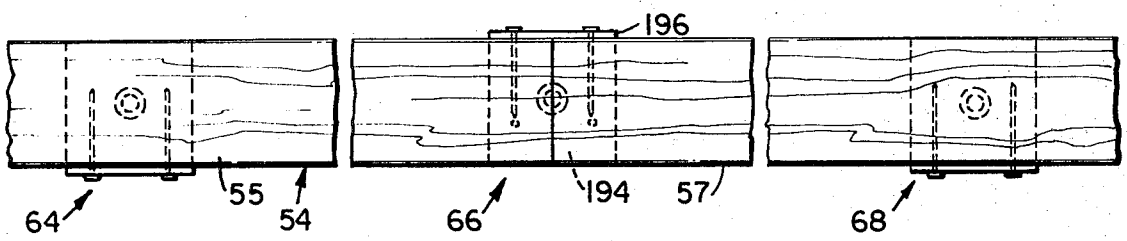


FIG_7

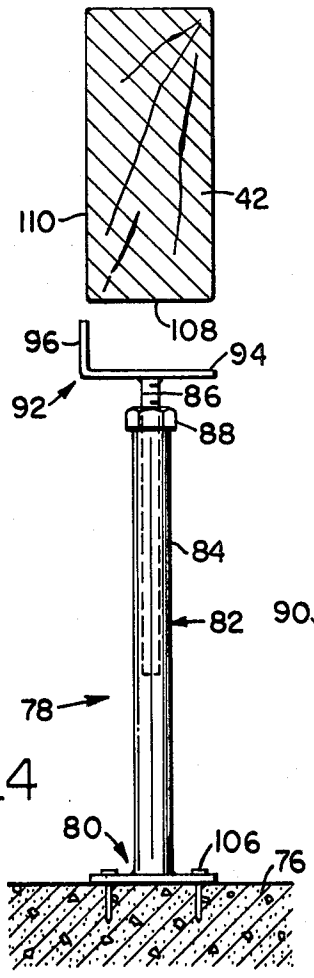


FIG_4

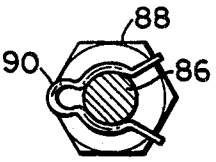


FIG_6

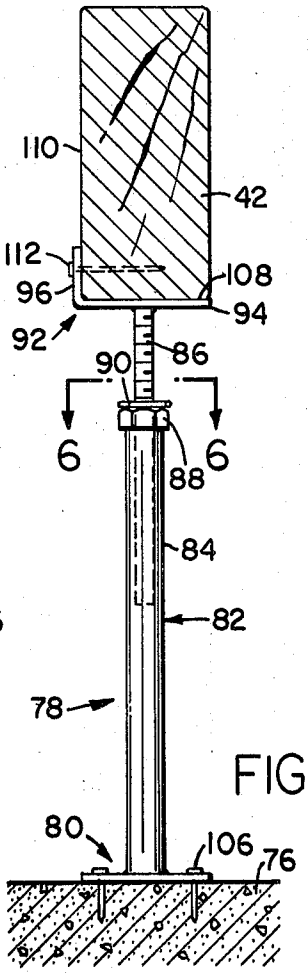


FIG_5

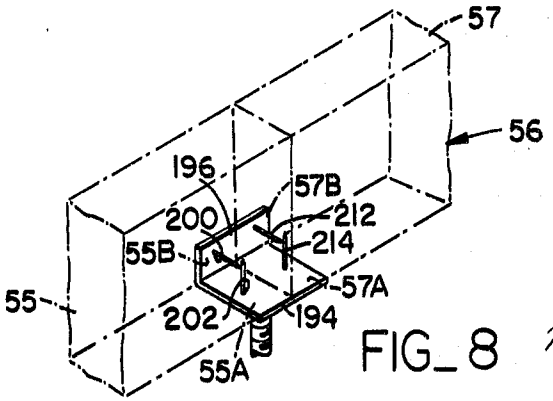


FIG_8

INVENTOR.
DONALD S. LEAR

BY

Mellin, Moore & Weissenberger

ATTORNEYS

BUILDING CONSTRUCTION SYSTEM

This application is a continuation of now abandoned application Ser. No. 799,297, filed Feb. 14, 1969.

BACKGROUND OF THE INVENTION

Generally, one of the first steps in the building of a frame house is the pouring of a continuous concrete support in a trench substantially in the form of the outline of the house. This continuous support carries the outer walls of the house and imparts rigidity to the foundation for the house. The foundation of a house also generally includes a number of cylindrical concrete footings poured into deep holes. On top of each footing is fixed a concrete pier, and fixed to each concrete pier on the top thereof is a flat sill block. A wooden pier post is then nailed at its bottom end to the sill block and its top end to a girder of the frame of the house. In this way, the frame of the house can be supported at its proper height relative to the ground.

Such an arrangement, besides being relatively complicated, has a number of drawbacks. Since the spacing between the footing and the girders is not uniform, particularly if the ground is uneven, it is essential that each pier post be cut to the exact length which will be needed to support the girder at the proper height.

A further drawback is that (particularly in adobe soils during the rainy season) the soil may expand and contract, or the girders of the frame may shrink when drying, resulting in the girders moving upward and being pulled loose from the pier posts. Such movement is generally compensated for by driving wedges between the pier posts and the girders and then nailing the wedges, obviously a time-consuming and unsatisfactory manner of adjustment.

Still another drawback is that such an arrangement provides for no means to compensate for warping of the girders.

Various prior art devices are known which provide an extendable and retractable structure extending between two members. See for example U.S. Pat. Nos. 3,222,030 (Thorpe), 1,848,476, (Hall), and 1,123,882 (Jensen). The Thorpe device is not adaptable for the use described, since it is shown and discussed as being used to support level, aligned steel beams in a fixed, permanent position, and, as such, does not suggest the desirability of using adjustable piers with concrete footings and wooden girders, as is necessary to this application. The Hall device, it will be seen, is designed to be fixed to upper and lower wooden planks when it is in a horizontal position. Then, it is raised to a vertical position. Clearly, this teaching could not be applied to the situation at hand, i.e., a concrete footing fixed to the ground, and the frame of a house. And, the Jensen patent is not a beam or girder supporting device at all, and as such is not fixed in any way to the upper and lower wooden beams used in conjunction therewith.

It is an object of this invention to overcome the problems of the conventional construction methods by providing a supporting pier running from a concrete footing to a wooden girder of the frame of a house, such pier being easily adjustable in length after being installed on the concrete footing.

It is a further object of this invention to provide a supporting pier which, while fulfilling the above object, fixes to both the concrete footing therebelow and the wooden girders thereabove in the proper manner, meanwhile allowing for warping or shrinking of the girder, or contracting of the soil, so that the pier does not pull away from either the concrete footing or the girder.

It is a still further object of the invention to provide a supporting pier which, while fulfilling the above object, is extremely simple and convenient to use.

It is a still further object of this invention to provide a system for supporting a frame having a plurality of horizontal girders, such system being able to allow temporary or seasonal heaving without damage to the support means of the system, yet permitting simple adjustment of the support means to compensate for permanent distortion or heaving.

SUMMARY OF THE INVENTION

Broadly stated, the inventive apparatus for supporting a generally horizontal girder above the ground comprises a concrete footing supported by the ground and positioned below the girder. An upright post has a base which contacts the concrete footing, and a body extending upwardly from the base to the girder. The post body comprises a tubular member extending upwardly from the base, a shaft slidable within the tubular member and extendable and retractable relative thereto, adjustment means for adjustably limiting the retraction of the shaft relative to the tubular member, and a top plate fixed to the top of the shaft, the shaft being extendable to a point where its top plate contacts the girder, the adjustment means being adjustable to limit the retraction of the shaft at the setting where the top plate contacts the girder. Means are included for fixing the base to the concrete footing.

The inventive system for supporting a frame having a plurality of horizontal girders comprises a plurality of such concrete footings, upright posts, combining therewith and being extendable and retractable in the same manner, and means associated with each post for adjustably limiting such retraction.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other objects of the invention will become apparent from a study of the following specification and drawings, in which:

FIG. **1** is a perspective view showing the prior art system of supporting the frame of a house;

FIG. **2** is a perspective view showing the system disclosed herein for supporting the frame of a house;

FIG. **3** is a perspective view of a portion of the pier disclosed herein, showing the method of fixing its base to a concrete footing;

FIG. **4** is a side elevation of the pier, fixed to the concrete footing and about to be adjusted up to a girder;

FIG. **5** is a view similar to that of FIG. **4**, but with the pier having been so adjusted;

FIG. **6** is a sectional view taken along the line **6—6** of FIG. **5**;

FIG. **7** is a plan view of a portion of a girder, showing a number of piers fixed thereto; and

FIG. **8** is a perspective view, partially in phantom, showing a girder made up of two girder portions abutting end to end, with a pier fixed thereto.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Shown generally in FIG. **1** is a system for supporting

a frame 10 of a house, the frame 10 being made up of a plurality of longitudinal wooden girders, such as girder 12. In such system, a number of cylindrical concrete footings, such as footings 14, 16 are poured into deep holes in the ground 18. A concrete pier 20 is placed on footing 14, preferably while it is wet, and a concrete pier 22 is placed on footing 16 while it is still wet. In this way, piers 20, 22 are adhered to the footings 14, 16. Sill blocks 24, 26 are positioned on top of concrete piers 20, 22, these sill blocks 24, 26 having nails partially driven into the bottom sides thereof (not shown), the nails being embedded into the concrete piers 20, 22 while they are still wet. The wet concrete in the system is then allowed to dry and harden.

Wooden piers 28, 30 are then cut to the exact length needed to support a girder 12 at the desired height above the ground 18. These wooden piers 28, 30 are then nailed to the sill blocks 24, 26, and the girder 12 is placed onto the tops of these wooden piers 28, 30, and nailed thereto. (It will be understood that a plurality of such means are included so that the frame may be supported in proper manner.)

It will be seen that such a system requires a relatively large number of parts. Furthermore, each wooden pier must be precisely measured; otherwise, proper support of the frame 10 will not be achieved.

It will also be seen that, if the ground heaves so as to expand and contract, or as the girders contract, a girder, as girder 12, may be pulled away from the piers 28, 30 loosening the nails in the pier system. This is compensated for by driving wedges (not shown) between the girders 12 and the tops of piers 28, 30. That manner of adjustment is obviously quite inconvenient and complicated.

Shown generally in FIG. 2 is the inventive system for supporting the frame 50 of a house, the frame 50 being made up of a plurality of longitudinal wooden girders, such as generally horizontal girders 52, 54, 56, of rectangular cross section. Means 58, 60, 62, 64, 66, 68, 70, 72, 74 are included as part of the system for supporting the girders 52, 54, 56.

Support means 58 include a large, cylindrical concrete footing 76, and an upright post 78, shown in FIGS. 3–6. The post 78 includes a base 80, and a body 82 extending upwardly from the base 80. The body 82, in turn, is made up of a tubular member 84 extending upwardly from the base 80, and a shaft 86 slidable within the tubular member 84. The shaft 86 can be extended and retracted relative to the tubular member 84. The shaft 86 is threaded along its length, and has threadably engaged therewith a nut 88. The nut 88 contacts and bears on the top of tubular member 84 to limit retraction of the shaft 86 relative to the tubular member 84. A clip 90 is positionable about the shaft 86 immediately above the nut 88 to limit the upward movement of the nut 88 along the shaft 86, as a result of vibration or the like, when the tubular member 84 bears on the nut 88.

A top plate 92 is fixed to the top of the shaft 86. The top plate 92 has a horizontal flat portion 94 and an upwardly extending flange 96 perpendicular to the flat portion 94. Four holes 98 are formed in the base 80, two holes 100 are formed in the flat portion 94, and two holes 102 are formed in the flange 96.

The other support means 60–74 include structure identical to that of support means 58.

In the assembly of the support means 58, concrete is poured into a deep hole in the ground 104, to form a concrete footing 76, supported by the ground 104. Although the posts 78 can be set into the wet concrete as hereinbefore described, it is usually more convenient to allow the concrete to harden. Base 80 of upright post 78 is then nailed to the concrete footing 76 by means of two concrete nails 106 which extend through base 80 and then into concrete footing 76 (four nail holes being included in case a nail is broken). The shaft 86, with nut 88 thereon, is positioned in the tubular member 84, in a relatively low position (FIG. 4). Means 60–74 are assembled in a similar manner.

The girders, including girders 52, 54, 56, are then put in place to form frame 50, the outer periphery of frame 50 resting directly on a concrete foundation (not shown). Top plate 92 is raised by turning nut 88 until flat portion 94 seats against a flat surface 108 of girder 52, and the flange 96 seats against a flat surface 110 of the girder 52 adjoining the surface 108 (FIG. 6). If the girder 52 is continuous where the particular means 58 are applied, nails 112 are driven only through holes 102 in flange 96 and then into girder 52 to fix it to the girder 52. These holes 102 are quite easily accessible, and nails therethrough are sufficient to hold the girder 52 (The building code usually requires two nails per girder section per post). The clip 90 is then positioned on the shaft 86 immediately above the nut 88. The nut limits the retraction of the shaft 86 into the tubular member 84 when the top plate 92 contacts the girder 52. The clip 90 limits the upward movement (by turning) of the nut 88 along the shaft 86 when the tubular member 84 bears on the nut 88. In this way, the girder 52 is supported above the ground 104.

The support means, such as means 66, may also be used to support a girder 54 made up of two aligned girder portions 55, 57 at the point where they abut end to end (FIG. 8). In such applications, flat portion 194 and flange 196 of top plate 192 seat against flat surfaces of each girder portion 55, 57. That is, flat portion 194 seats against surface 55A of girder portion 55, and surface 57A of girder portion 57. Flange 196 seats against surface 55B of girder 55, and surface 57B of girder 55. Nails 212 are then driven through holes 200 in flat portion 194, and into girder 54, and nails 214 are drawn through holes 202 in flange 196, and into girders 54. Thus two nails are driven into each girder portion 55, 57, as required by most building codes for requisite strength.

As shown in FIG. 2, the entire system includes a plurality of concrete footings similar to footing 76, and a plurality of upright posts, each being the same as post 78. Each post is applied to the concrete footing therebelow, and to the girder thereabove, in the same manner as previously described. The means associated with any given girder, as means 64, 66, 68 associated with girder 54, have their upright flanges positioned on alternating sides of the girder 54 (FIG. 7). In this manner, it is insured that the girder 54 (and the other girders) are kept straight.

It should be noted that, since each top plate includes only a single upright flange, a certain amount of leeway is allowed between a girder and the top plate associated therewith. That is, a girder will still be probably fixed to a top plate even though there may be a gap between the upright flange thereof and the girder. A system in which the top plate included two upright flanges, one

for either side of a girder, would not allow for such leeway or misalignment, since a girder would have to be seated between the two upright flanges before the top plate could be fixed to the girder.

It should be noted that because of the clearance provided between the shaft and tubular member of each upright post, slight lateral movement of any girder will not pull any nails out. It will merely result in the shafts being moved sideways relative to their associated tubular members. The same is true for twisting warp of the girders, as the shafts can tilt slightly with respect to the tubular members.

The base of any upright post, as base **80** of post **78,** need not necessarily be nailed to its associated concrete footing. Rather, the base can be embedded into the concrete while it is still wet, or it can be set while the concrete is partially wet by driving ordinary nails through the holes in the base and into the partially wet concrete, which then sets tightly to the nails.

Again taking post **78** as an example, as the ground **104** contracts, or as the girder **52** dries and shrinks, the shaft **86** is lifted up to an extent out of the tubular member **84.** Such movement can be easily compensated for by removing clip **90,** tightening nut **88** down until it contacts tubular member **84,** and replacing clip **90.** This is obviously a quite simple adjustment compared to the driving of wedges, as part of the prior art system described above.

During the rainy season, the ground around the house, (but not thereunder) may heave, and then can be expected to settle when the ground around the house dries out. During such heaving, the top plate of each upright post will be moved away from the base thereof. The body of each upright post allows such movement, since it is extendable, and the top plate and base will remain fixed to the girder and footing associated respectively therewith. This is not the case with the prior art device described above, where the girder will be pulled from the tops of the wooden piers (i.e., the nails fixing the tops of the wooden piers to the girders will be pulled out).

In the system herein described, when the ground dries out, each top plate will be moved toward the base of each upright post, the body of each upright post being retractable to allow such movement. This heaving and settling of the ground is allowed for without damage to the connections between the footings, upright posts and girders.

No part of the system need be cut to an exact length which depends on the lumber of the support means. The base **80** of the upright post **78** is firmly fixed to the concrete footing **76** by nailing or embedding, as previously described, and to the girder **52** in proper manner. Meanwhile heaving of the ground **104** and/or warping of the girder **52** is easily compensated for. These advantages, of course, apply throughout the system.

Moreover, the support means used in the system are extremely simple, and require a minimum of parts.

I claim as my invention:

1. Apparatus for supporting a generally horizontally disposed girder above the ground, said girder having at least two juxtaposed substantially flat surfaces thereon, the apparatus comprising:

a concrete footing supported by the ground and positioned below the girder;

an upright post having a base contacting the concrete footing and a body extending upwardly from the base to the girder, said post body comprising a tubular member extending upwardly from the base, a shaft loosely slidable within the tubular member and extendable and retractable relative thereto, adjustment means operatively engaging said shaft and said tubular member for adjustably limiting the retraction of the shaft relative to the tubular member and a top plate fixed to the top of said shaft for engaging said girder, said adjustment means being adjustable to limit the retraction of the shaft when said plate engages said girder;

said plate including a substantially flat planar portion directly engaging one of the flat surfaces of said girder and only one flange extending directly upwardly from said planar portion and substantially normal thereto directly engaging the other flat surface of said girder;

means associated with said flange for fixing said flange to the other flat surface of said girder; and

means for fixing the base to the concrete footing.

2. Apparatus according to claim **1** wherein the means for fixing the base to the concrete footing comprise a plurality of nails extending through the base and into the concrete footing.

3. Apparatus according to claim **1** wherein the means for fixing the upwardly extending flange to the girder comprise a plurality of nails extending through the upwardly extending flange and into the girder.

4. Apparatus according to claim **3** wherein the girder comprises a pair of aligned girder portions abutting end to end, the flat portion and upwardly extending flange of the top plate seating against flat surfaces of each girder portion, wherein at least one of the plurality of nails extending through the upwardly extending flange extends into each girder portion, and wherein are further included additional means for fixing the top plate to the girder comprising a plurality of nails extending through the flat portion and into the girder, at least one of the plurality of nails extending through the bottom portion extending into each girder portion.

5. Apparatus according to claim **4** wherein the shaft is threaded along its length, and wherein the adjustment means comprise a nut threadably engaged with the shaft, the nut contacting and bearing on the top of the tubular member to limit retraction of the shaft, and a clip which fits about the shaft immediately above the nut to limit the upward movement of the nut along the shaft under the force of the tubular member bearing thereon.

6. A system for supporting a frame having a plurality of generally horizontally disposed girders above the ground, each of said girders having at least two juxtaposed substantially flat surfaces thereon, the system comprising:

a plurality of concrete footings supported by the ground, each footing being positioned below a girder;

a plurality of upright posts, each post having a base in contact with a concrete footing, a body extending upwardly from the base to the girder, each of said bodies comprising a tublar member extending upwardly from the base, a shaft loosely slidable within the tubular member and extendable and retractable relative thereto and adjustment means operatively engaging each of said shafts and said tubular members for adjustably limiting the retrac-

tion of the shafts relative to the tubular members and a top plate fixed to the top of each of said shafts for engaging said girders, each of said adjustment means being adjustable to limit the retraction of the shafts when said plates engage said girders;

each of said plates including a substantially flat planar portion directly engaging one of the flat surfaces of each of said girders and only one flange extending directly upwardly from said planar portion and substantially normal thereto directly engaging the other flat surface of each of said girders;

means associated with each of said flanges for fixing each of said flanges to the other flat surface of each of said girders; and

means for fixing the bases of each of said posts to a concrete footing.

7. A system according to claim **6** wherein the means for fixing the base of each post to a concrete footing comprise a plurality of nails extending through the base of each post and into each concrete footing.

8. A system according to claim **6** wherein the means for fixing the upwardly extending flange of each top plate to a girder comprise a plurality of nails extending through the upwardly extending flange of each top plate and into a girder.

9. A system according to claim **8** wherein at least one girder comprises a pair of aligned girder portions abutting end to end, the flat portion and upwardly extending flange of the top plate of a post seating against flat surfaces of each girder portion, wherein at least one of the plurality of nails extending through the upwardly extending flange extends into each girder portion, and wherein are further included means for fixing the flat portion to the one girder comprising a plurality of nails extending through the flat portion and into the one girder, at least one of the plurality of nails extending through the bottom portion extending into each girder portion of the one girder.

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