

[54] SAFETY BARRIER

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[58] Field of Search 61/60, 61; 256/59, 64, 256/65, 68, 70, 72, 73; 52/731, 726, 630, 645, 574, 473, 660; 182/113, 178; 49/55

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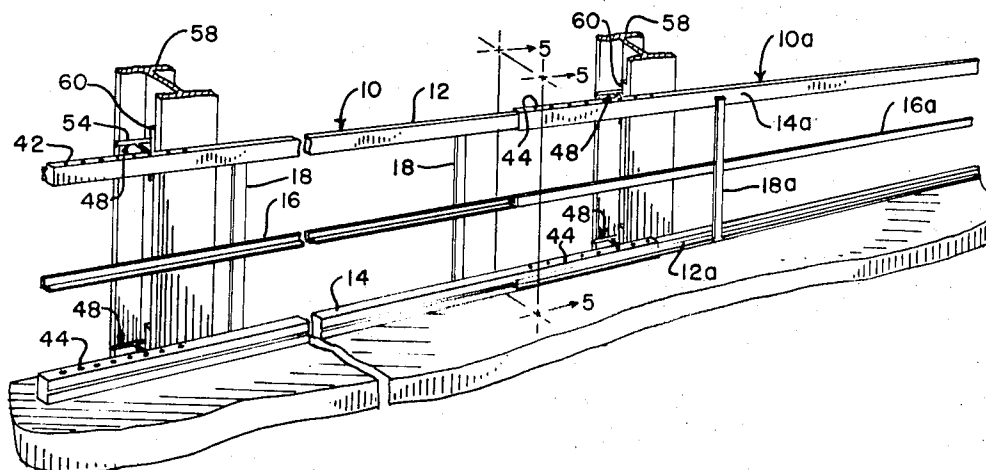
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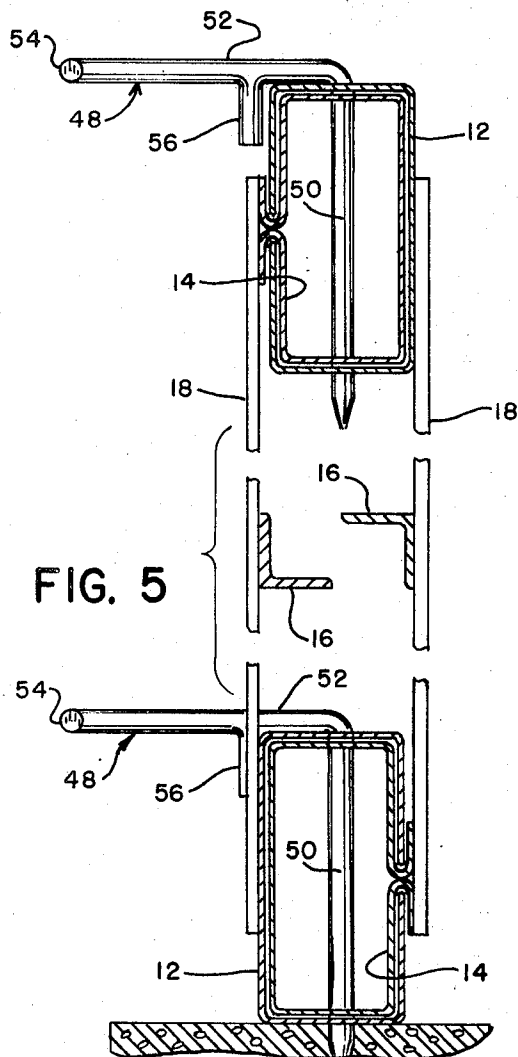
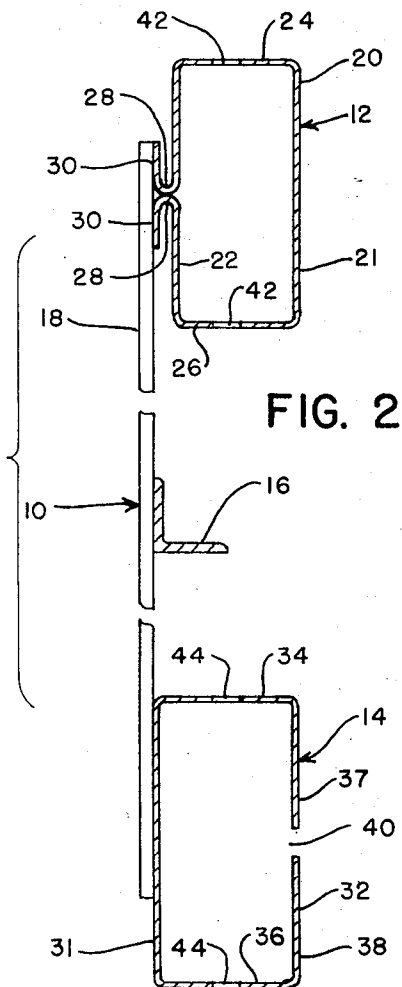
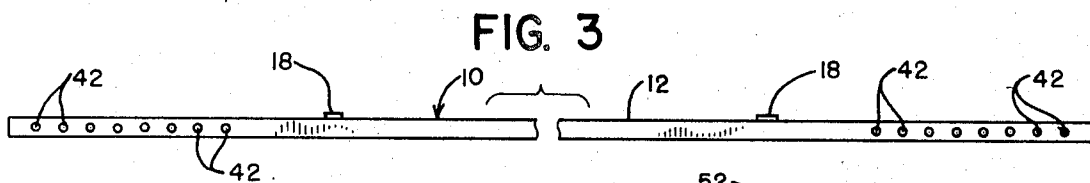
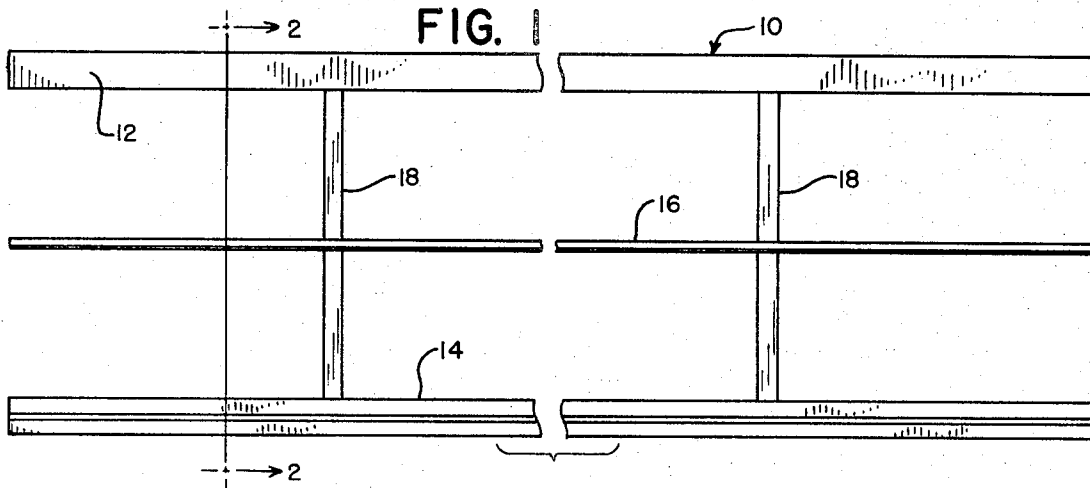
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ABSTRACT

A readily installable and removable safety fence or barrier for use around the perimeters of open floors, or around openings in the floors, of buildings under construction, particularly multistory buildings. The safety fence or barrier is composed of a plurality of individual sections positioned in endwise relationship, each of the sections including a pair of longitudinally extending hollow rails secured in spaced relationship by uprights. The sections are of such construction that upon the inversion of alternate sections, end portions of one of the rails of an alternate section will be telescopically received within end portions of rails of adjacent intermediate sections, and the end portions of the other rail of the alternate section will telescopically receive end portions of the other rails of the adjacent intermediate sections. Means are provided to readily and temporarily secure the adjacent sections together and to a building member.

12 Claims, 7 Drawing Figures





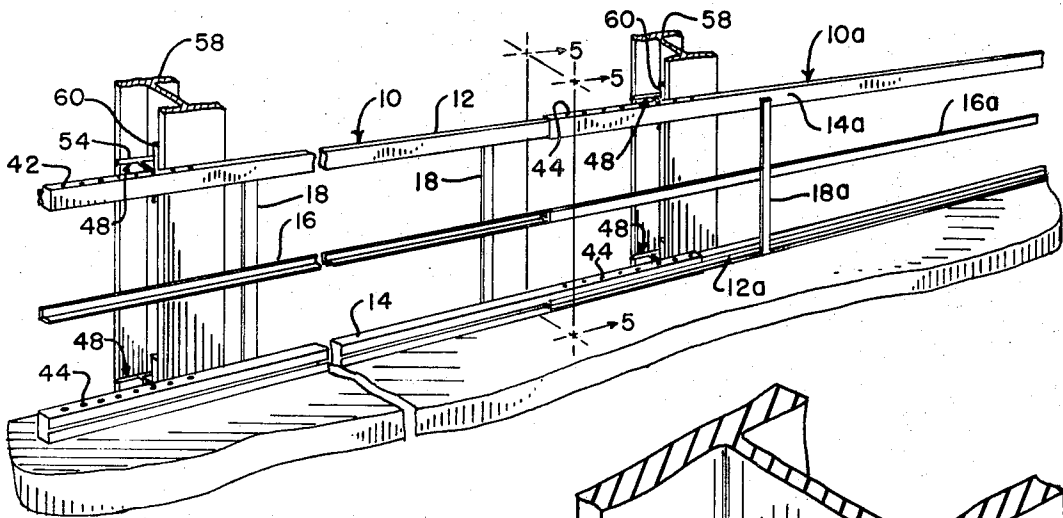


FIG. 4

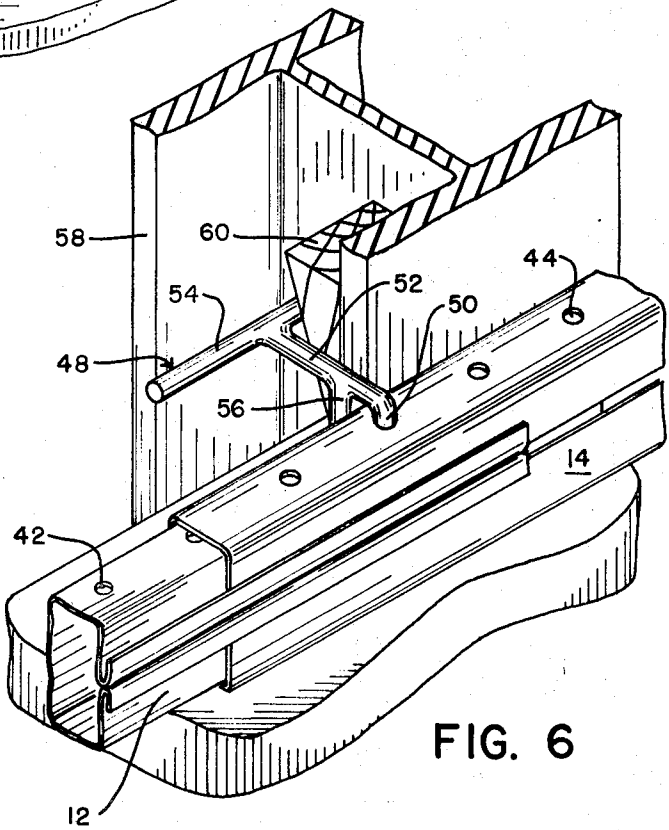


FIG. 6

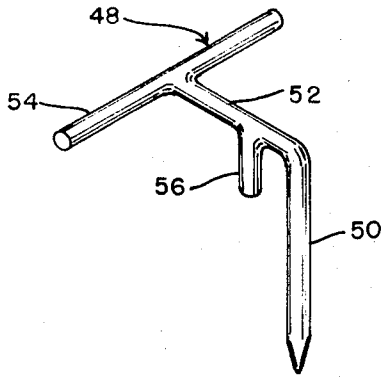


FIG. 7

SAFETY BARRIER

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention concerns safety fences or barriers particularly for employment in connection with the construction of multistory buildings, the fences being adapted for temporary installation adjacent the outer perimeters of the floors and around openings therein such as elevator shafts, stair wells and the like, to provide for the personal safety of the workmen and also to prevent items lying on the floor from being accidentally displaced over the edges thereof or into openings such as elevator shafts and the like, previously referred to.

2. Description of the Prior Art

In the past it has been conventional to provide such necessary barriers for the protection of workmen and others by erecting temporary fences around the periphery of each floor and around openings therein, the fences being made of conventional lumber. Such fences have numerous disadvantages in that if they are to successfully perform the desired functions, they must be of relatively elaborate construction requiring a substantial amount of time and effort on the part of carpenters or other workmen. Also, when so constructed, they are, for all practical purposes, adapted for a single use only.

More recently, efforts have been made to provide barriers which can be more readily installed and thereafter removed for reuse, such efforts being represented by the barriers disclosed in U.S. Pat. to Dickey No. 3,589,682 issued June 29, 1971, and Lionetto No. 3,662,993 issued May 16, 1972. However, in the patented constructions, the barrier is adapted for use only between two existing floors as an essential feature is the provision of posts extending between the ceiling of an overlying floor and an underlying floor and pressed thereagainst to maintain the posts, and the fence structure supported thereby, in position. Hence, these prior patented constructions have no applicability to situations where the overlying floor has not been erected. Also, they are of relatively complicated construction.

SUMMARY OF THE INVENTION

The principal object of the instant invention is the provision of a sectional fence and of individual sections therefor, the fence finding a primary field of use as a safety barrier in the construction of multistory buildings, which does not require the presence of an overlying building element such as a ceiling and which may be readily installed and thereafter removed for reuse.

Another object of the invention is the provision of a safety fence or barrier attaining the foregoing object composed of a plurality of individual sections with each section having end portions telescopically received by or receiving end portions of adjacent sections to a greater or lesser extent, as desired.

Another object of the invention is the provision of a sectional fence attaining the foregoing objects in which the several sections may be readily connected in a plurality of endwise adjusted relationships to produce a fence of the desired length for the particular situation in which it is to be employed.

Another object of the invention is the provision of a sectional fence attaining the foregoing objects in which the means for readily connecting the sections in endwise adjusted relationship is adapted for employment as a means for securing the fence in an upright position from elements of the building, such as vertically-extending columns.

Briefly, the fence or barrier of the preferred embodiment of the instant invention which attains the foregoing objects and other objects which will become apparent is made up of individual sections, each section including longitudinally extending spaced rails, the rails being secured in their spaced relationship by uprights positioned at intervals along each section. In addition, a reinforcing member, such as an angle member, is preferably secured to the uprights, the reinforcing member extending longitudinally intermediate the rails. The several elements are made of steel and the securing of certain elements to others of each section is obtained by welding operations.

The rails are each of a hollow construction and suitably are rectangular in cross section although they may be of other cross sectional shapes. Each of the rails, as hereinafter explained in more detail, will, when the sections are assembled to form a fence, be the top rail in some instances and the bottom rail in other instances. One of the rails has a fully extending side wall to which the uprights are attached as by welding. The opposite side wall has a slot extending longitudinally of and for the full length of the rail, the slot being located midway between the top and bottom walls of the rail. The other rail of each section, preferably also of hollow construction, includes elements projecting outwardly from one of the side walls thereof and projecting outwardly from one of the side walls thereof and projecting in upward and downward directions respectively in spaced parallelism to the side walls to define flanges which are secured preferably by welding, as previously mentioned, to the uprights. The body element of the last-mentioned rail of each section consisting of the top, bottom and side walls, but omitting the flanges and portions of the outwardly projecting elements supporting them, is of such cross sectional dimensions as to be telescopically received within the hollow interior of the first-mentioned rail of an adjacent section when the two sections are placed in endwise but relatively inverted relationship to one another.

In assembling sections making up the railing or barrier, they are placed in adjacent but relatively inverted relationship and an end portion of the body element of the rail of smaller cross sectional dimensions of one section is slid into and telescopically received in the hollow rail of larger cross sectional dimensions of the other section, and similarly the rail of larger cross sectional dimensions of the one section telescopically receives the body element of the rail of smaller cross sectional dimensions of the other section. The projecting elements of the rails of smaller cross sectional dimensions in each instance will extend through the longitudinally extending slots, previously mentioned, formed in one side wall of the rails of larger cross sectional dimensions. The assembly of sections with alternate sections inverted with respect to intermediate sections is continued until a fence or barrier of approximately the desired length is obtained.

For securing adjacent sections in their assembled relationship with a relatively wide range of lengthwise ad-

justment, the end portions of each rail are provided with a longitudinally extending series of vertically aligned openings or perforations in the top and bottom walls thereof, the perforations being equally spaced in series. As will be understood in the erection of the fence, perforations in the end portions of the rails of alternate sections are brought into alignment with perforations in the end portions of the rails of intermediate sections telescopically received therein. Pin elements of attaching members are then passed through selected of the aligned perforations to secure the sections together in fixed endwise adjusted relationship. In the preferred embodiment of the invention, the attaching members not only include the pin elements to secure the sections in assembled relationship, but also include means adapted for cooperation with a fixed building element, such as an upwardly projecting column, for securing the assembled rail in its desired predetermined position.

As will be appreciated, fence sections constructed and assembled as described above provide a relatively low-cost, readily assembled and disassembled fence or barrier which may be reused without modification when it has served its purpose in a particular location. The length of the fence may be adjusted within relatively wide limits and relatively small tolerances.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is an elevational view with parts broken away of a fence section in accordance with the instant invention;

FIG. 2 is a sectional view on an enlarged scale taken on the line 2—2 of FIG. 1;

FIG. 3 is a top plan view of the fence section of FIG. 1;

FIG. 4 is a perspective view on a reduced scale of two of the fence sections of FIG. 1 in assembled relationship and in an erected condition;

FIG. 5 is a sectional view on an enlarged scale taken on the line 5—5 of FIG. 4;

FIG. 6 is an enlarged detail view illustrating the attachment of fence sections to a building member; and

FIG. 7 is an enlarged perspective view of the attachment means shown in FIG. 6.

Referring now to the drawings and more particularly to FIGS. 1, 2 and 3, an individual fence section indicated by the numeral 10 is illustrated, the section being adapted to be assembled in endwise telescoping relationship with other corresponding sections, as will later be described. The fence section includes an upper steel rail 12 and a lower steel rail 14, the two rails being in spaced relationship, and an intermediate reinforcing steel angle bar 16. The rails and the reinforcing bar 16 are maintained in the positions illustrated by steel uprights 18 suitably secured as by welds to the rails and to the reinforcing bar.

As illustrated particularly in FIG. 2, rail 12 includes a main or body element 20, preferably of hollow, open-ended construction, formed of flat sheet steel. The body element includes side walls 21 and 22 and upper and lower walls 24 and 26 respectively. While the tubular construction described above is preferred, rail 12 could, if desired, be made as a solid member, as will become apparent hereafter. Projecting from side wall 22 and suitably located substantially on the longitudinal center line and suitably extending for the full length

thereof are outwardly projecting elements 28 preferably formed integrally with the side wall and terminating in flanges 30 lying parallel to but spaced from wall 22. Flanges 30 are secured as by welds to uprights 18 to maintain rail 12 in its assembled relationship thereto.

Rail 14 is formed from flat sheet steel and has a hollow open-ended interior defined by side walls 31 and 32 and upper and lower walls 34 and 36 respectively. Wall 32 is composed of two parts or flange portions 37 and 38, the adjacent ends of the flange portions being spaced to define a longitudinal slot 40 suitably extending the full length of the rail and of a width to readily accommodate the element 28 of a rail corresponding to rail 12. The hollow interior of rail 14 is of such cross sectional dimensions and shape as to readily and relatively snugly receive a rail of the cross sectional dimensions and shape of rail 12 slid endwise therein.

As best shown in FIGS. 2 and 3, walls 24 and 26 of rail 12 are provided with two series of vertically aligned openings or perforations 42 located on the longitudinal center lines of the walls, one series beginning adjacent one end of the rail and the other adjacent the opposite end of the rail, both series extending longitudinally of the end portions of the rail for a substantial distance. End portions of the upper and lower walls 34 and 36 respectively of rail 14 similarly are each provided with a series of vertically aligned openings or perforations 44 located on the center lines of the walls. Perforations 44 are of the same diameter and are spaced apart the same distances as perforations 42. Also, similarly as in the case of perforations 42, one of the series begins adjacent one end of the rail and the other begins adjacent the opposite end of the rail, the two series being of a length suitably equal to that of the series of perforations 42.

For purposes of example but without in any way limiting the invention thereto, the main dimensions of a typical fence section of the above-described construction will be given. The over-all lengths of rails 12 and 14 would be 12 feet. The height of the fence sections — namely, the distance from wall 36 of rail 14 to wall 24 of rail 12 — would be 42 inches. The spacing of uprights 18, measuring from the center lines thereof, from the ends of the rails would be 3 feet. The body element 20 of rail 12 would be substantially 2 by 4 inches and rail 14 would be only of sufficiently larger interior cross section to slidably but relatively snugly receive a rail of the type of rail 12. Uprights 18 would be flat steel bars 2 inches in width and three-sixteenth inch in thickness. Reinforcing member 16 would be a steel angle iron with the flanges thereof 1 inch in width and one-eighth inch in thickness. Perforations 42 and 44 of each series in rails 12 and 14 respectively would be spaced 3 inches on centers and each series would be eight in number.

Referring now particularly to FIGS. 4 and 5, the manner in which two of the sections are assembled to form a portion of a fence will be described, it being understood that additional sections will similarly be assembled with the two sections where necessary to provide a wall of the length required. One of the sections 10a, the several parts of which will be indicated by the same reference characters as previously employed but with the addition of the suffix a, is inverted with respect to the other section 10 and the two are brought into endwise alignment. One of the sections is, or both are, then

moved endwise to insert an end portion of the rail 12 of section 10 into an end portion of rail 14a of section 10a. Similarly, an end portion of rail 12a of section 10a is inserted into an end portion of rail 14 of section 10. The extent of the insertions will be such that the overall length of the combined sections is that desired and also such that at least certain of the perforations 42 in rails 12 and 12a will be in vertical alignment with at least certain of the perforations 44 in rails 14 and 14a.

The rails of the sections are then secured together in their telescoped relationship by fastening devices 48 illustrated in detail in FIG. 7 and which include a pin element 50, by inserting the pin element in selected of the aligned apertures of the upper rails and similarly inserting a pin element in corresponding aligned apertures of the lower rails, the pin elements being of such length as to at least penetrate the apertures of both the upper and lower walls of the telescoped rail portions, as shown particularly in FIG. 5.

Fastening devices 48 also may perform the function of securing the assembled rail sections in upright positions to columns or other elements of the building frame structure. For this purpose the devices each include a portion 52 extending at right angles to the pin portion 50, and a laterally extending portion 54 joined at its midpoint to portion 52, whereby with portion 52 it defines what is in effect a "T." Each device 48 also has a downwardly projecting portion 56 in parallelism to pin element 50 and spaced therefrom a distance such that when the pin element is inserted in the aligned perforations of the rails of assembled sections, portion 56 will lie adjacent an outer wall of the telescoped rails. Also, the pin element which, as previously mentioned, is preferably somewhat longer than the distance between the top and bottom walls of the telescoped rails, is preferably sharpened or pointed.

Referring now particularly to FIGS. 4 and 6, one example of the manner in which the attachment of assembled fence sections to structural building elements may be readily achieved is illustrated. As shown, the attachment is made to conventional flanged building columns, such as columns 58, by positioning the connecting members for the upper and lower assembled rails in aligned apertures relatively adjacent the columns and with one of the arms forming the head 54 of the T of each connecting member behind the flange of a column. In each instance a wedge 60 of wood or other suitable material and of the required dimensions is then driven between the arm of the T and the column flange until the associated rail of the fence is in firm engagement with the column. Where the floor or deck on which the lower fence rails rest permits it, the sharpened pin of the connector for the lower rails may also be driven into the floor or deck for additional securement.

As will be appreciated from the foregoing description of the preferred embodiment of the invention, the individual fence sections are of relatively simple and inexpensive construction. Also, they may be readily assembled to provide a fence of a desired length, the adjustability through relatively wide limits provided by the telescoping relationship of the rail elements of adjacent sections contributing substantially thereto. Also, when the fence has served its purpose in one location, it may be readily disassembled and the individual sections re-

moved to a second location for the erection of a fence of any appropriate length at such location.

I claim:

1. A fence section adapted for partial telescopic assembly with a corresponding section when said corresponding section is in an inverted position relatively to said fence section to provide a longitudinally extending barrier, said fence section comprising first and second rails in spaced relationship and means connecting said rails and maintaining them in said spaced relationship, said means connecting said rails terminating at said rails, said first rail having a body element including end portions of given cross sectional dimensions and shape and said second rail including longitudinally extending hollow interior end portions dimensioned and positioned to telescopically receive an end portion of a body element of a rail corresponding to said first rail when said corresponding rail is in an inverted position with respect to said first rail, said end portions of said first and second rails each including means for cooperation with means for securing said fence sections to a corresponding section in an endwise adjusted relationship when said fence section is in partial telescopic assembly with said corresponding inverted section.

2. A fence section as defined in claim 1 wherein said means connecting said rails comprises uprights at spaced intervals and said first rail of said fence section has means extending laterally outwardly from the body element for securement to said uprights and there is means securing said uprights thereto, and said second rail has a longitudinally extending opening leading to the hollow interior thereof, said longitudinally extending opening being dimensioned and positioned to permit the extension therethrough of the laterally outwardly extending means of said rail corresponding to said first rail.

3. A fence section as defined in claim 1 wherein said means included in the end portions of said first and second rails for cooperation with means for securing said fence section to a corresponding section in an endwise adjusted position when said fence section is in telescopic assembly with said corresponding section comprises a series of longitudinally spaced perforations.

4. A longitudinally extending barrier particularly adapted to guard open work areas during the construction of a building, the barrier comprising an assembled series of individual fence sections, each of said sections being in an inverted position with respect to an adjacent section and each including spaced rails and uprights connecting said rails at spaced intervals, one of the rails of each section including open-ended hollow end portions and the other of said rails of each section having a body element including end portions dimensioned to be received within the hollow end portions of a rail corresponding to said one rail, the one rail of one of said sections telescopically receiving an end portion of the body element of the other rail of an adjacent section and an end portion of the body element of the other rail of said one of said sections being telescopically received within the hollow end portion of the one rail of said adjacent section, and there is means for securing said end portions in their telescoped relationship.

5. A fence section adapted for assembly with corresponding sections to provide a longitudinally extending barrier, said fence section comprising first and second rails in spaced relationship and uprights connecting

said rails at spaced intervals and maintaining them in said spaced relationship, said first rail having a body element including end portions of given cross sectional dimensions and shape and said second rail including longitudinally extending hollow interior end portions dimensioned and positioned to telescopically receive an end portion of a body element of a rail corresponding to said first rail when said corresponding rail is in an inverted position with respect to said first rail, and wherein said first rail of said fence section has means extending laterally outwardly from the body element for securement to said uprights and there is means securing said uprights thereto, and said second rail has a longitudinally extending opening leading to the hollow interior thereof, said longitudinally extending opening being dimensioned and positioned to permit the extension therethrough of the laterally outwardly extending means of said rail corresponding to said first rail, and wherein the end portions of said first and second rails each include a series of longitudinally spaced perforations for the reception of means for securing said fence section to a corresponding section in an endwise adjusted position when said fence section is in telescopic assembly with said corresponding section.

6. A longitudinally extending barrier particularly adapted to guard open work areas during the construction of a building, the barrier comprising an assembled series of individual fence sections with adjacent sections in inverted relationship to each other, each section including spaced rails and means connecting said rails, one of the rails of each section including opened hollow end portions and the other of said rails of each section having a body element including end portions dimensioned to be received within the hollow end portions of a rail corresponding to said one rail, the one rail of one of said sections telescopically receiving an end portion of the body element of the other rail of an adjacent section and an end portion of the body element of the other rail of said one of said sections being

telescopically received within the hollow end portion of the one rail of said adjacent section, and wherein said end portions of said rails each include a longitudinally extending series of spaced perforations with the spacing of said perforations being the same for each of said end portions of said rails.

7. A longitudinally extending barrier as defined in claim 6 wherein at least one of the perforations in the end portion of the body element of a rail of a section received in an end portion of a rail of an adjacent section is in alignment with a perforation in said end portion of said rail of said adjacent section.

8. A longitudinally extending barrier as defined in claim 7 wherein there is means for connecting said sections, said connecting means including means penetrating said aligned perforations.

9. A longitudinally extending barrier as defined in claim 8 wherein said connecting means includes means for cooperation with a fixed building element adjacent said barrier to maintain said barrier in a predetermined position.

10. A longitudinally extending barrier as defined in claim 9 wherein said connecting means including means penetrating said aligned openings and including means for cooperation with said fixed building element comprises a pin received within said aligned openings and a member projecting therefrom and including an arm for affording said cooperation with said fixed building element.

11. A longitudinally extending barrier as defined in claim 10 wherein said building element includes a flange portion and said arm for affording cooperation with said fixed element is positioned behind said flange portion and there is securing means interposed between said arm and said flange portion.

12. A longitudinally extending barrier as defined in claim 11 wherein said securing means comprises a wedge.

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