April 2, 1935. O. WERNER 1,996,358

BUILDING FOUNDATION

Filed Feb. 6, 1931

Fig. 1,

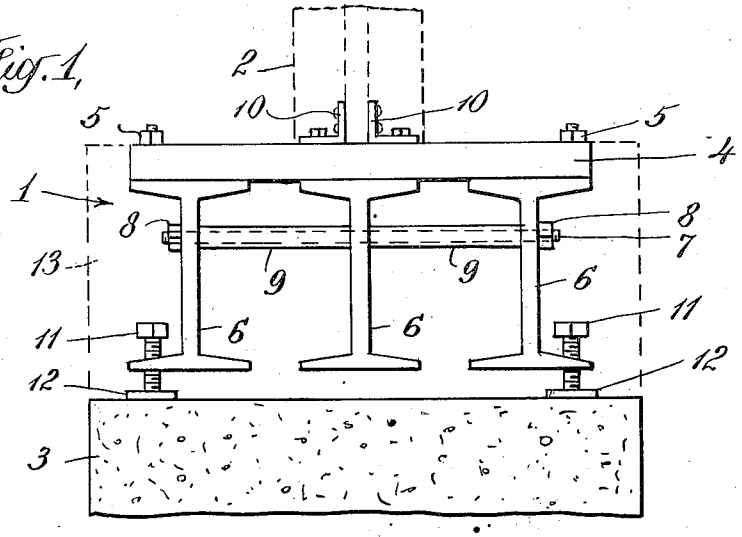
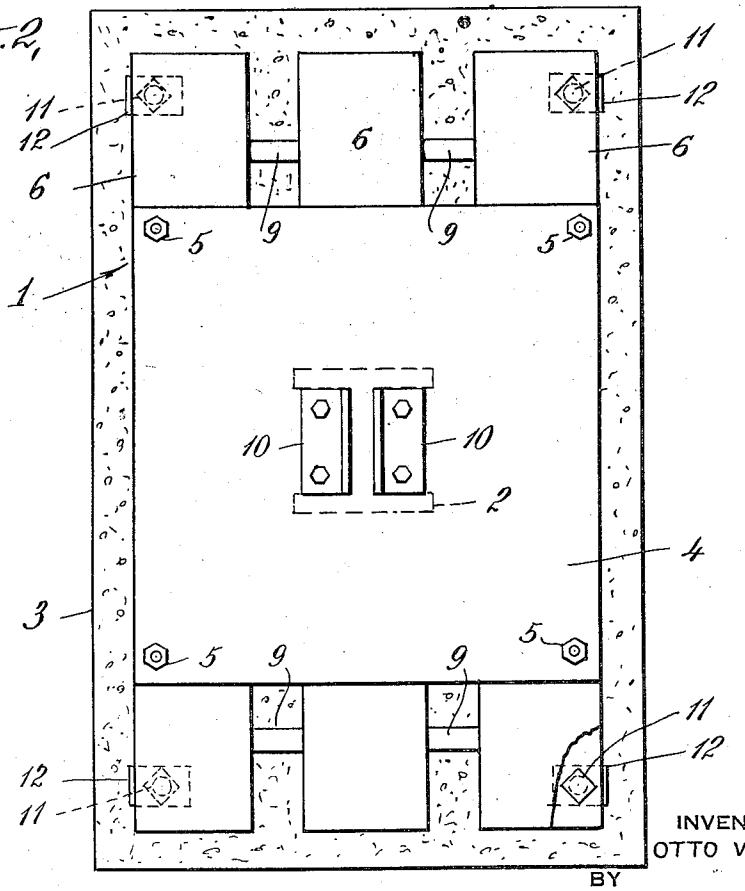


Fig. 2,



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BUILDING FOUNDATION

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3 Claims. (Cl. 72—77)

This invention pertains to improvements in building foundations, particularly to the foundations of large buildings having a steel superstructure or frame. More especially the invention relates to improved means for setting in position on a footing or stone, concrete, masonry, etc, the metal bases or grillages which serve to transfer the load of the building superstructure uniformly onto the footing.

A primary object of the invention is to mount the metal base or grillage upon feet adapted temporarily to support the same in spaced relation upon the footing, the feet being individually and continuously adjustable in height in order to provide a means for quickly and accurately levelling the base or grillage prior to grouting at a preselected elevation corresponding to grade or level lines.

In large buildings employing a steel frame or superstructure the load of the steel supporting columns is transferred to a footing of masonry, stone, concrete or the like, through the medium of metal bases or grillages which translate the rather concentrated load of the column into one of lesser proportions per unit area uniformly distributed over a correspondingly larger surface. In this way the danger is lessened of exceeding the maximum crushing strength of the footing.

After having been properly set upon the footing, the base or grillage is grouted in position, and thereafter but prior to erection of the steel superstructure, the base or grillage is made an integral part of the footing by means of a concrete shoulder encasing the same which is built up flush with the upper edge of the metal-work.

Great care must be exercised in setting the grillages, etc. initially. They must not only be carefully adjusted to grade but must be accurately levelled; since otherwise in the one instance the load of the superstructure will not be transferred proportionately to the several piers or footings; and in the other instance the load of a given column will not be distributed uniformly over the desired area of the associated footing. In either contingency the unit pressure will greatly exceed the precomputed amount for certain portions of the footing.

Heretofore the accepted practice in setting to grade or line levels, all grillages, metal slabs or bases, or steel columns with bases fabricated as an integral part of the column, has been through the medium of metal or wooden wedges or shims interposed in proper proportion at several points of support between the grillage or other base and the footing. Such is the method outlined in the standard handbook of the American Institute of Steel Construction. The wedges or shims are piled one upon another to the extent required not only for adjusting the base to the required elevation but also for accurately levelling the base at such elevation.

This procedure is tedious, slow and correspondingly expensive. It becomes particularly cumbersome and laborious when, as is the usual case, the grillage or other base must not only be adjusted to grade level but must also be set accurately in accordance with the building line or column centers. Thus, if after having carefully wedged or shimmed the grillage or base to grade level, it is found to be slightly out of alignment with respect to the building line or column centers, it cannot in general be merely shifted laterally by the requisite amount owing to slippage of the shims or wedges which destroys the levelling adjustment. Consequently the whole tiresome process must be repeated.

A further objection to the present practice is that the comparatively loose shims or wedges introduce an element of uncertainty as regards the load carrying capacity of the completed substructure. Where the shims or wedges employed are of wood the compressive strength of which is practically nil under the enormous loads encountered, this element of uncertainty in design becomes greatly exaggerated. Construction engineers have frequently pointed to this consideration as constituting a serious defect to the existing methods of setting metal grillages and the like.

In order to overcome the above noted objections, it is proposed by the present invention to provide the grillage, etc. with a plurality of metal feet for supporting the same temporarily in spaced relation upon the footing prior to grouting. The feet are individually and continuously adjustable in height throughout a range in values, in order to provide means for quickly and accurately levelling the grillage at the desired elevation. If now it is found that the grillage is slightly off the building line or column centers, it may be shifted laterally the requisite amount without in general destroying the levelling adjustment. In any event the necessary corrections in this latter respect may be easily accomplished by a slight additional adjustment in elevation of one or more supporting feet.

One very simple and efficient means of carrying the invention into effect is to employ three or four bolts screw-threaded through the lower portion of the grillage etc. in such fashion that the bolts projecting below the grillage serve as feet

for supporting the same upon the footing. The bolts heads are formed to fit a hand wrench whereby individual adjustment is effected. By this modification, the old and laborious method of levelling is replaced by one which combines the mentioned advantages of simplicity and expedition with reliability of adjustment.

The metal bolts firmly screwed to the base eliminate the mentioned uncertainty heretofore introduced by the relatively loose metal or wood shims and wedges. When the grillage etc. is set in accordance with the present invention and then grouted and concreted in place preparatory to erection of the superstructure, there remains nothing under the grillage which is of doubtful carrying capacity.

Referring now to the drawing Fig. 1 shows in end elevation a grillage in accordance with this invention positioned to transfer the load from a column onto a pier or footing;

Fig. 2 is a plan view of the construction of Fig. 1.

The grillage 1 supports the column 2 and in turn rests upon the pier or footing 3 of masonry, concrete, stone, etc. The grillage comprises a billet plate 4 having affixed to the underside thereof by means of bolts and cooperating nuts 5, a series of parallel I beams 6 held together in proper spaced relation in integral assembly by means of tie rods 7, nuts 8 screw threaded thereon and the interposed pipe separators 9. Angles 10 are riveted to the column 2 and billet plate 4 for maintaining the columns in position.

The adjustable feet or levelling means of the present invention comprise the bolts 11 screw-threaded through the exposed lower flanges of the outer I beams. The bolts are provided with square, hexagonal or other suitably shaped heads for adjustment by a hand wrench or the like, and normally project below the grillage in order to support the same in spaced relation upon the footing 3.

The levelling operation is effected by screwing up all the bolts 11 until the upper surface of the billet plate 4 attains approximately the desired elevation. The bolts are then individually adjusted to accurately level the grillage while bringing it to the exact elevation corresponding to the level line. It will be apparent that should the grillage thus levelled be found slightly off the building line or column centers, it may be shifted laterally the requisite extent without in general disturbing the levelling adjustment, and in no case will more than a minor degree relevelling be required. Bearing plates 12 may, if desired, be interposed between the levelling screws and the footing.

After the grillage has thus been properly located on the pier or footing and set to grade level, it is grouted in position. Subsequently and prior to erection of the steel superstructure, concrete is employed to build up the pier on footing 3 flush with the upper surface of the billet plate 4 as is indicated by the dotted line 13. The supporting column 2 is shown dotted merely for the sake of completeness. It is to be understood that it is not in general affixed to the billet plate until after the grillage is set, grouted and made an integral part of the footing by addition of the concrete shoulder 13 encasing the same.

While the invention has been described as applied to a grillage consisting of parallel spaced I beams affixed to a billet plate, the same means may be employed without modification for levelling any sort of metal slab or base, steel column with base fabricated as an integral part thereof or other support which requires accurate levelling at a preselected elevation prior to being grouted and subsequently concreted to a footing or pier.

What I claim is:

1. In a building foundation wherein a metal grillage functions to transfer the load of a superstructure uniformly onto a footing, the combination with said grillage of metal bolts screw-threaded through the base thereof for adjustably supporting the grillage temporarily on said footing, whereby said grillage may be accurately levelled at a preselected elevation prior to grouting the same to said footing.

2. In a building foundation wherein a metal grillage functions to transfer the load of a superstructure uniformly onto a footing, in combination a grillage comprising a billet plate, a series of parallel spaced I beams affixed to one side thereof, and adjusting bolts screw-threaded through the exposed flange of certain of said I beams for supporting said grillage temporarily in spaced relation upon said footing whereby said grillage may be accurately levelled at a preselected elevation prior to grouting the same to said footing.

3. In a building foundation, a stone or concrete footing, a metal grillage, and means adjustably supporting said grillage upon said footing in spaced relation thereto, said means comprising a plurality of metal bolts screw-threadedly affixed to said grillage and positioned to adjustably support the same on said footing, whereby said grillage may be accurately levelled at a preselected elevation above said footing prior to grouting thereto.

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