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TELESCOPIC METAL GIRDERS

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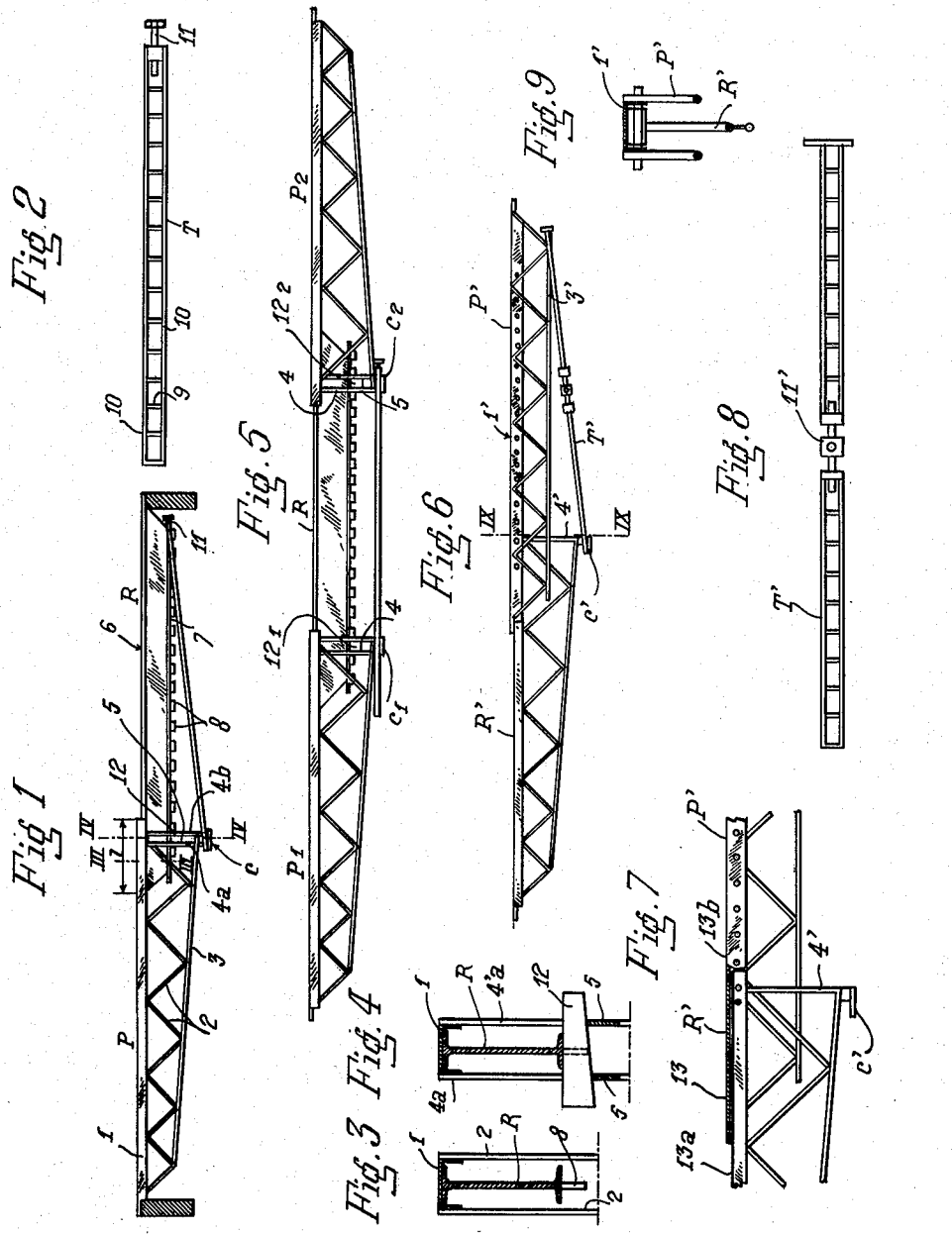

Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

Fig. 6

Fig. 7

Fig. 8

Fig. 9

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# TELESCOPIC METAL GIRDERS

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1 Claim. (Cl. 189—37)

My invention has for its object improvements in telescopic metal girders serving in reinforced concrete structures, chiefly to be used for floors.

Such girders provided with extensions, allow cutting out all the staying means used hitherto and their interest lies chiefly in the fact that they may serve for spans or bearing distances of various lengths, which spans may be comparatively large. However, the length of the system including the girder and its extension in its expanded condition, as required for use, is limited in the case of large bearings, as a consequence of the straining to which the system is subjected, chiefly at the point where its component elements are interconnected. It is therefore necessary to give them a suitable resistance, the good condition of their connection governing the rigidity of the whole system. In order to increase the resistance of the girders as required, it is therefore necessary, in the case of comparatively large bearings, to resort to girders and extensions for the latter which are both provided throughout their length with a sufficient height, since the inertia of such elements depends chiefly on their height and this leads to heavy and bulky structures and, consequently, to many drawbacks, to wit: a high cost price and difficult transportation handling and erection. It is possible, it is true, to resort to lighter structures, but the system would then risk showing a too large flexibility.

It would be therefore of advantage to resort to much lighter structures associated with oblique stays and vertical king-posts. As a matter of fact, such an arrangement would allow resorting to elements having a considerable height and, thereby, a high inertia at the point of connection between the girder and its extension, while its height would be clearly lower at the ends of the system resting on stationary bearings and this would lead for a given application to using elements of a weight which is clearly lower than that of the elements already known in the art.

However, such elements which are conventional for frameworks including ordinary girders having a predetermined length spanning the space separating two bearing surfaces, are not applicable inter alia to the girders including a plurality of elements telescopically sliding inside each other to match various spans or bearing distances, by reason of the compressional forces which have a tendency to make such elements slide inside one another.

Now, my invention has for its object to allow the application of oblique stays to girders provided with extensions, with all the advantages of a light structure, a reduction in cost price and an easy handling, while the system obtained remains however rigid and subjected as a whole to a camber suiting the conditions of use.

My invention consists in providing a girder including a plurality of elements adapted to suit various bearing distances, with a removable runged stay engageable at one end through one of its rungs on one of the girder elements, while its other end is provided with screw-controlled clamping means or the like, in association with a runged locking system operating endwise through a stop in a direction parallel with the axis of the girder system, to urge the elements forming said system against each other.



I have illustrated in the accompanying drawings two preferred embodiments of my invention. In said drawings:

FIGS. 1 to 4 show a girder provided with a single extension, FIG. 1 being an elevational view of the whole system and FIG. 2 a front view of the stay, illustrated separately.

FIGS. 3 and 4 are large-scale transverse cross-sections of details of the girder system through lines III—III and IV—IV of FIG. 1 showing respectively the location of the extension slidably carried inside the girder and the locking through a single double-acting wedge operating both longitudinally and vertically.

FIG. 5 is an elevational side view of a modified girder including two girder elements and an intermediate extension.

FIGS. 6 to 9 relate to the second embodiment and, more precisely, FIG. 6 is a side elevational view of the girder system, FIG. 7 shows a portion of said view on a larger scale, FIG. 8 is a front view of the stay and FIG. 9 a cross-section through line IX—IX of FIG. 6.

Turning now to FIGS. 1 to 4, it is apparent that the girder P has its upper flange constituted by an inverted channel iron **1** connected by a trellice-work **2** with a lower flange **3** sloping downwardly and forming a stationary stay between the outer end of the girder and the upright **4** which acts as a king-post. The end of girder P adjacent the king-post is thus deeper than the other end of girder P. Said king-post upright includes in practice four-bars, of which two are welded to each side of the upper flange **1**, as shown at *4a–4b* and *4'a–4'b*, the four bars being all connected together through their lower ends, so as to form a unit incorporating or provided with a hook system C. At a suitable level, the four bars carry and are rigidly secured through welding or otherwise to a horizontal plate **5** adapted to support the extension R, as disclosed hereinafter; said extension is constituted by an I iron extending horizontally between the two pairs of uprights *4a–4b* and *4'a–4'b* and vertically between the plate **5** and the upper flange **1** of the girder. The upper flange **6** of the I iron is housed slidingly inside the channel iron member **1**. A series of projecting blocks or cleats **8** are secured to the underside of the lower flange of the extension. Lastly, a tie means or stay T which is independent and removable, is provided as shown in FIG. 2, in the shape of a runged ladder **9**, between two stringers **10**. One of the ends of said stay or ladder is provided with clamping means constituted, for instance, by a screw **11**.

The system including the main girder and its extension is first brought to the desired length, so that it may rest on the desired bearing surfaces, while two successive cleats **8** are located to either side of the gap separating the uprights *4a–4b* as illustrated in FIG. 1. It is sufficient to slide over the plate **5** through the aperture between the uprights of each pair *4a–4b* or *4'a–4'b* a locking member **12** which locks the extension R against any longitudinal sliding with reference to the beam **1**. The stay T is then secured through hooking of one of its rungs over the lower end C of the king-post unit **4**, in a manner such that the clamping screw **11** may be in a position for which it engages a stop provided for this purpose, at the end of the extension or at a point near said end of the extension. Upon screwing down of said screw **11**, the stay is tensioned and it is thus possible to give the system including the girder and its extension the rectilinear shape or the camber required.

It is also necessary to ensure a vertical clamping of the I iron forming the extension in contacting relationship with the inverted channel iron forming the member **1** of

the girder. It is sufficient, to this end, for the locking member **12** to have its lower and upper surfaces forming a locking wedge member, as illustrated in FIG. 4, in order to obtain as simply as possible the locking in a horizontal direction against relative sliding of the two elements of the compound girder and extension system and a clamping of said elements in a vertical direction. Obviously, the extension should be engaged by a sufficient length *l* inside the girder, so that the stresses to which said elements are subjected in their contacting area, may be limited.

In FIG. 5, the compound girder system includes two terminal girders P1 and P2 which are interconnected by an intermediate extension R. The ladder-shaped stay T is then inserted between the lower ends C1 and C2 of the upright king-posts of the two terminal girders, while the locking of the three elements, both horizontally and vertically, is obtained as precedingly by the locking members or wedges $12_1$ and $12_2$.

In FIGS. 6 to 9, the extension R′ forms a trellice-work and the same is the case for the girder P′, but the extension is higher than the girder P′. The web and the depending sides of the upper inverted U-shaped iron **1′** forming the upper flange of the girder holds slidingly, as in the preceding case, the upper flange of the extension constituted by a channel iron **13** rigid with an upper bearing shoe **13***a*, in the case illustrated. However, in this latter embodiment, the extension carries the upright king-post **4′** with the means C′ adapted to engage through hooking the stay T′, which latter is hooked, on the other hand, through a suitable rung to the outer projecting end of the lower flange **3′** of the girder, while the tensioning of the stay is provided by a system of two screws of opposite pitches **11′** inserted in the medial section of the length of said stay. In order to lock the two elements of the system both against longitudinal sliding and relative rocking movements, there is provided in the case of said second embodiment, a series of openings in the sides of the upper U-shaped flanges of the girder and of its extension, while a simple pin is inserted through any desired cooperating openings which are brought into registry, as clearly shown in FIG. 9. It should be remarked that the use of this improved arrangement furthers considerably the dismantling of the girder with reference to its extension; as a matter of fact, once the floor has set, it is sufficient to release gradually the stay, so as to prevent the pin from being subjected any longer to the action of the load and to allow its ready removal; a subsequent tightening of the stay produces a sliding of one element of the system with reference to the other, which allows their removal. In order to prevent the rocking of one of the elements with reference to the other, one



of them, say the extension in the case illustrated, includes, beyond its end engaging the upper flange **1′** of the girder and beyond the king-post **4′**, a projection **13***b* bearing against the girder, as shown more particularly in FIG. 7.

Obviously, many other arrangements may be resorted to in the execution of my invention, according to the applications to be considered and the conditions to be satisfied or to be selected as more advantageous in the different cases, said modifications lying obviously within the scope of the accompanying claim.

What I claim is:

A telescopic girder for supporting timbering for reinforced concrete, comprising a first beam having a horizontal top chord and an inclined bottom chord so that the first beam has one end deeper than the other, upright king post means at said deeper end, a second beam telescoping at one end with said deeper end of said first beam, said second beam having a series of downwardly depending longitudinally spaced cleats disposed lengthwise thereof, said king post means having an aperture extending laterally therethrough, a locking wedge member removably disposed in said aperture and extending removably between an adjacent pair of said downwardly depending cleats thereby adjustably positioning said first and second beams in any of a plurality of longitudinally adjusted positions relative to each other, tie means interconnecting the lower end of said king post means below said wedge and the end of said second beam remote from said first beam, and means tensioning said tie means.


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