Nov. 1, 1955 R. C. YATES ET AL 2,722,045

CONSTRUCTION FORMS

Filed Aug. 10, 1951

Fig. 1.

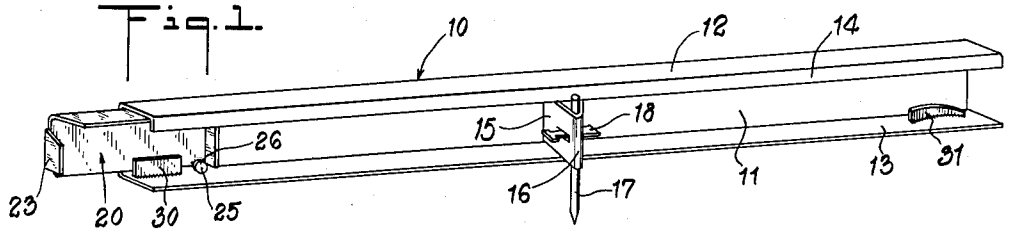
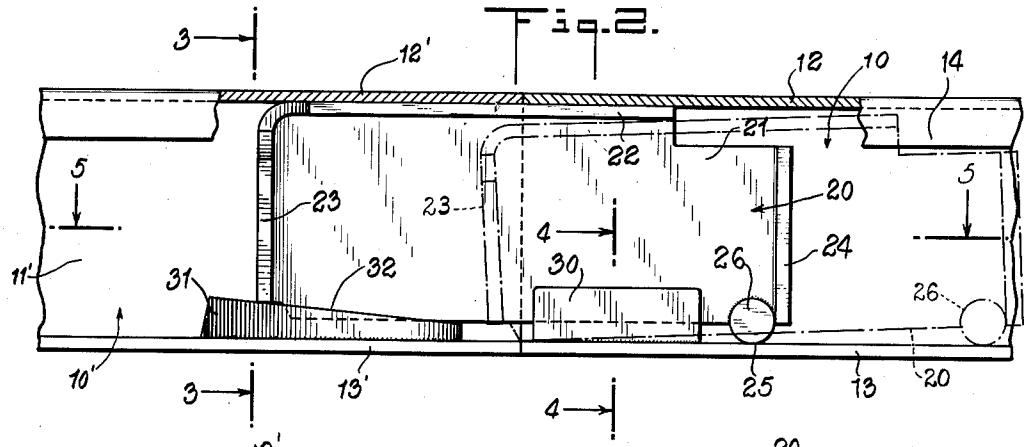


Fig. 2.



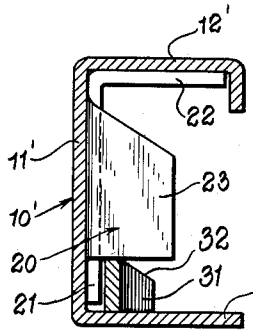


Fig. 3.

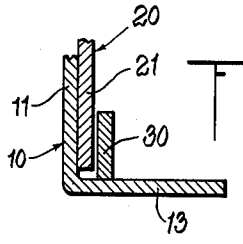


Fig. 4.

Fig. 5.

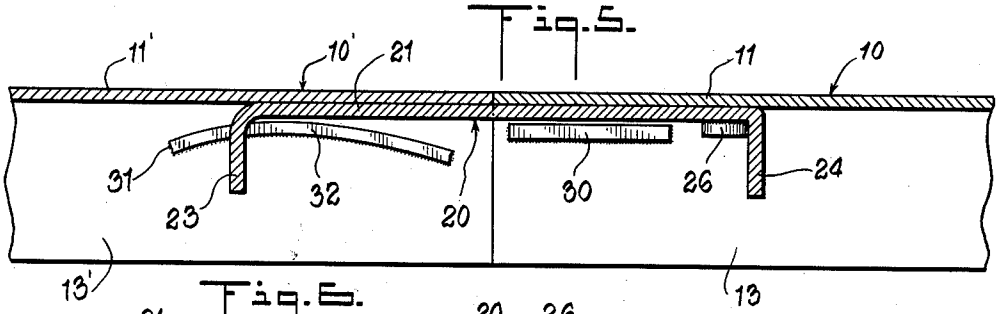
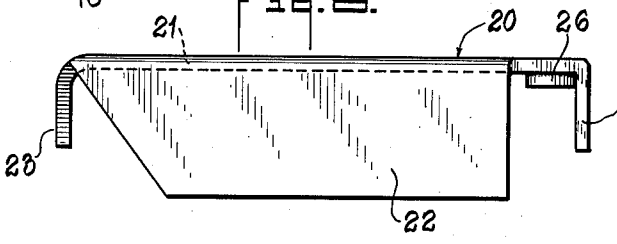


Fig. 6.



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United States Patent Office 2,722,045 Patented Nov. 1, 1955

2,722,045

CONSTRUCTION FORMS

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Application August 10, 1951, Serial No. 241,228

12 Claims. (Cl. 25—118)

This invention relates to apparatus adapted for use in building structures of concrete and similar materials and more particularly to road rails and similar forms used in the building of roads, sidewalks, curbs, gutters and the like.

One of the objects of the present invention is to provide novel and efficient means for connecting adjacent ends of sections of forms used in the construction of roads, walks and the like.

Another object of the invention is to provide novel means in combination with sectional road rails and similar forms for obtaining and maintaining both line and grade alignment of adjacent sections thereof.

Still another object is to provide end connecting means for construction forms of the above character which are simple and efficient both in structure and operation.

A further object is to provide connecting and aligning means for sectional road forms and the like which are sufficiently sturdy and rugged and novelly combined with said forms in such a manner as to withstand the roughest use and misuse to which such equipment is ordinarily subjected.

Still another object of the invention is to provide an end connection for sectional construction forms which functions in a novel manner to provide desirable rigidity at the joints between the sections and which materially facilitates the connection and alignment of the sections.

A still further object is to provide novel apparatus of the above character wherein there are no loose parts which are apt to be lost when the form sections are being moved from one location to another.

Another object is to provide end connecting means for sectional construction forms which are novelly constructed and combined with the forms to facilitate disconnection of the sections and removal thereof from the structure without appreciable danger of injuring or defacing the structure.

The above and further objects and novel features of the invention will more fully appear from the following detail description when the same is read in connection with the accompanying drawings. It is to be expressly understood, however, that the drawings are for the purpose of illustration only and are not intended as a definition of the limits of the invention.

In the drawings, wherein like reference characters refer to like parts throughout the several views,

Fig. 1 is an isometric view of one type of road rail or curb form embodying the present invention;

Fig. 2 is a side elevation view, partly in section and with parts broken away, showing the adjacent ends of two rails or forms connected together in longitudinal alignment in accordance with the present invention;

Fig. 3 is a sectional end view taken substantially on line 3—3 of Fig. 2;

Fig. 4 is a detail sectional view with parts broken away, the section being taken substantially on line 4—4 of Fig. 2;

Fig. 5 is a detail sectional view with parts broken away, the section being taken substantially on line 5—5 of Fig. 2; and

Fig. 6 is a top plan view of the locking slide which forms a part of the end connecting means comprehended by the invention.

As illustrated in the accompanying drawings, by way of example, the invention is embodied in a construction form adapted for use in the building of roads, sidewalks, curbs, or the like with concrete or similar materials which are customarily poured into the forms or molds and permitted to set or harden before the forms are removed. Sections or form bodies are made up in suitable lengths, and in use a number of form bodies are set up end-to-end along a desired line and grade in a manner well understood in the art to confine and support the concrete or other material until hardened. The form bodies are ordinarily subjected to rough handling and other severe shocks and stresses during use and must accordingly be sturdily constructed to avoid bending and twisting thereof, and the joints between the ends of adjacent form bodies of the form should be sturdy and capable of assisting in the maintenance of the line and grade of the combined form bodies. In order to facilitate handling of the form bodies which are heavy at best, the same should be constructed of as few parts as possible, and the same should be so constructed as to permit easy and accurate installation thereof by a small number of hands in a minimum period of time. The means for connecting the ends of the form bodies should also be such as to facilitate quick and easy disconnection of each form body and removal thereof from the concrete or other structure without damaging the latter. The novel construction of the present invention accomplishes all of these results and fulfills the foregoing objects.

In the embodiment shown, each form body **10** is channel-shaped in vertical transverse section and comprises a web **11** which normally assumes a vertical position during use. An upper horizontal flange **12** extends at right angles from the upper edge of the web and is provided with a turned-down edge or lip **14** which thereby forms what may be called a double flange **12, 14**. Extending at right angles from the lower edge of web **11** is a flange **13**, the outer edge of which, although not so shown, may be turned upwardly to form a double flange similar to the double flange **12, 14**.

Each section or form body **10** may be supported by stakes associated therewith in any suitable known manner and driven into the ground. In practice, it is usually desirable to employ two or more stakes with each form body **10**. In the illustrated embodiment, only one stake and stake pocket are shown, by way of example, the same being of the type disclosed and claimed in Yates copending application Serial No. 146,850, filed February 28, 1950. The stake pocket **15** consists of a sheet metal strap bent to form a bend or bight **16** for receiving a cylindrical stake **17** and welded or otherwise suitably secured at its edges to the web **11** and upper and lower flanges **12, 13** of the form body **10**. A flat wedge member **18** extends through slots in the side walls of the stake pocket, and the wider portion thereof is adapted to be securely wedged between the stake and the remote ends of the slots to effect a rigid support for the form body. On a form body ten feet long, two stake pockets are usually positioned five feet apart and two and one-half feet from each end so that stakes will occur at five-foot intervals on a series of form bodies connected in end-to-end relation. For some installations, one stake and stake pocket may be sufficient whereas in others, it may be desirable to use even more than two on some or all of the form bodies.

The above described form bodies are generally made of steel to provide adequate strength, and the same are

accordingly relatively heavy, thus making it difficult in practice to effect proper line and grade alignment of adjacent form bodies during installation. Novel means are accordingly provided for connecting and aligning adjacent form bodies **10**, said means being easily manipulated and adapted to provide mutual end support for said form body so that less man-power is required to obtain quick and more satisfactory installation. As shown, said means comprises a rigid slide **20** mounted in a novel manner for novel cooperation with adjacent ends of two form bodies **10**. The connecting slide may be formed of sheet metal cut and bent to comprise a web portion **21**, an upper flange **22**, a front flange **23** and a rear flange **24**. A downwardly extending pivot or projection **25** is provided at the rear lower edge of web portion **21** for a purpose to be later described. In the form shown, pivot projection **25** is the lower portion of a cylindrical piece **26** welded or otherwise suitably secured to the outer face of web **21** to function as a stop in a manner to hereinafter appear. Slide **20** is preferably formed to have a sliding fit in a form body **10** with web portion **21** of the slide in face-to-face engagement with web **11** of the form body. The height of web portion **21** plus the pivotal projection **25** is preferably about the same as the distance between flanges **12** and **13**, and upper flange **22** of the slide preferably has a sliding fit between web **11** and flange lip **14**. Projection **25** rests on the lower flange **13** and the rear upper portion of the slide is cut away as best seen in Fig. 2 to permit pivotal action of the slide about the contact point between said projection and the flange **13**.

The lower edge of slide **20** is guided and maintained in position by a guide **30** consisting of a flat plate secured edgewise to lower flange **13** by welding or other suitable means. One end of guide plate **30** is engaged by stop **26** to limit the forward movement of slide **20**, i. e., movement to the left as viewed in the drawings. Rearward or right-hand movement of the slide as viewed in the drawings is limited by the engagement of guide plate **30** by front flange **23** on the slide. The slide is thus movably mounted on form body **10** in such a manner as to prevent ready removal and loss thereof during movement of the equipment from one location to another. When the slide is in its extreme rearward or right-hand position, it will be completely housed within form body **10** and protected thereby.

When two form bodies **10**, **10'** are in registering or abutting end-to-end engagement, the forward end of slide **20** slidably fits into form body **10'** and cooperates in a novel manner with a fixed wedge or cam member **31** secured to the lower flange **13'** of form body **10'**. In the illustrated embodiment, said cam member consists of a sheet metal block or strip having an inclined upper edge **32** and being curved inwardly or convexly toward web **11'** from the lower end of the cam surface which is nearest the adjacent end of the form body. The front flange **23** of the slide terminates short of the bottom of the slide and engages the edge **32** of cam **31**. Thus, when the ends of form bodies **10** and **10'** are in abutting relation, and slide **20** is moved forwardly into form body **10'**, cam **31** is effective to lift the upper flange **22** of the slide into firm frictional engagement with upper flange **12'** of said form body. With the end of slide **20** thus wedged into position in form body **10'**, the abutting form bodies are joined together in substantially perfect alignment, and the joint thus formed may be reasonably rigid. The slide may be forced into wedging or connecting position by striking rear flange **24** a blow with a hammer or other suitable tool. In practice, one of the form bodies **10** or **10'** is first set up and staked on the desired line and grade so that one end of the other form body may be supported in position by slide **20** while the stakes therefor are being set. In this way, installation with proper alignment of the farm bodies may be obtained speedily by a minimum number of men with the least amount of equipment.

It may be noted that the forward edge of the portion of slide web **21** below front flange **23** is bevelled (Fig. 2), that the forward edge of upper slide flange **22** is bevelled (Fig. 6), and that the radius of the bend between front flange **23** and web **21** is relatively large. Thus, if there is any misalignment of the form bodies before slide **20** is moved into position, these bevelled surfaces will cooperate with the end of form body **10'** and force proper alignment as the slide moves from form body **10** into form body **10'**.

When it is desired to remove the forms from a concrete or similar structure, it is only necessary to move slides **20** rearwardly within the form bodies on which the same are permanently mounted, and the forms may then be readily removed without danger of defacing the structure. It may be necessary to strike either flange **23** or **24** a blow with a hammer to dislodge a slide for disassembly of the connected form bodies. It may be noted that each form body may have a connecting slide at one end and a cam block **31** at the other end as shown in Fig. 1. If desired, however, alternate form bodies may have slides or cam blocks at both ends thereof.

The connection and disconnection of the form bodies **10**, **10'**, as well as the proper alignment thereof during installation, is facilitated by the pivotal action of slide **20**. When the slide is in non-operating position, as shown by dotted lines in Fig. 2, there will be a substantial clearance between the forward end of flange **22** and flange **12** or **12'** and lesser but ample clearance between the rear end of flange **22** and flange **12** to insure easy sliding movement of the slide. This clearance above flange **22** results from the counter-clockwise pivotal movement of slide **20** about pivot **26**, as viewed in the drawing, and the fact that the rear end of flange **22** is forward of a vertical line containing the pivotal axis **25** of the slide. As the forward end of the slide rides up on cam member **31** during forward movement of the slide, the latter pivots clockwise on projection **26** to bring flanges **12** and **12'** of the form bodies into horizontal alignment and substantially flat engagement with the upper surface of flange **22**, as shown in solid lines in Fig. 2.

There is thus provided novel construction forms comprising form bodies which are so constructed as to facilitate the installation of a series of form bodies on proper line and grade with a minimum of manpower effort and a minimum of equipment. The form bodies thus provided embody novel means for connecting and aligning abutting ends of adjacent form bodies in such a manner as to substantially solidify the joint and thus more evenly distribute the stresses and strains during use. Additionally, the end connections thus contemplated do not involve any loose or removable parts and the number of relatively movable parts is minimized. The construction of the form bodies is very simple and yet very sturdy, and the small number of parts involved may be readily and inexpensively made and assembled.

Although only a limited number of modifications of the invention are illustrated in the accompanying drawings and described in the foregoing specification, it is to be expressly understood that the invention is not limited thereto. Various minor changes may be made in the design and arrangement of parts illustrated as well as in the materials suggested without departing from the spirit and scope of the invention as the same will now be understood by those skilled in the art.

What is claimed is:

1. In a construction form, two longitudinally aligned body members, each said body member being channel-shaped in transverse section and comprising a vertical web and upper and lower flanges at the upper and lower edges of the web, respectively, said upper flange having a downturned edge forming a channel with said web, and means for aligning and connecting said body members comprising a sheet metal slide having a web engaging the aligned

webs of said body members, a flange at the upper edge thereof engaging the upper flanges of said body members and slidably fitting between said vertical web and down-turned edge, a flange at the forward end of said slide web terminating short of the lower edge thereof and a downwardly extending projection adjacent the rear end of the web portion to pivotally support said rear end of the slide on the lower flange of one of said body members, a vertical guide plate secured to said lower flange adjacent said slide web for longitudinally guiding said slide, a guide plate on the lower flange of the other of said body members and having an inclined upper edge engageable by the lower edge of the flange on the forward end of said slide, whereby the forward end of said slide is pivoted upwardly into frictional engagement with the upper flange of said other member in response to longitudinal movement of the slide from said one member into the other.

2. Construction apparatus comprising first and second channel-shaped body members in registering end-to-end engagement, a locking slide slidably mounted in said first body member and extending into said second body member, and cam means on said second member for cooperation with said slide to effect frictional engagement between the slide and said second body member in response to movement of the slide from said first member toward said second member, said cam means being constituted by an inclined sheet metal piece secured to a horizontal flange of said second body member and curved in a horizontal plane, said slide having a portion extending between said piece and the web of said second body member and a portion engageable with the inclined edge of said piece to guide the slide into engagement with the other horizontal flange of said second body member, the portion of said piece nearest said web being most remote from said first body member and spaced from said web a distance sufficient only to slidably receive said first-named portion of the slide, whereby cooperation between said cam means and said slide during said movement of the latter effects any required vertical and lateral movements of one of said body members relative to the other to bring the same into longitudinal alignment.

3. Construction apparatus comprising a channel-shaped body member having a web, an upper flange, a lower flange and a down-turned lip on said upper flange, a locking slide slidably supported by said lower flange and including a web adjacent said first-named web, an upper flange adjacent the upper flange of said body member and having a close sliding fit between said first-named web and lip and laterally projecting means on the forward end only of said slide for cooperation with cam means on an adjacent channel-shaped body member, and means on said lower flange for guiding the longitudinal movement of the lower edge of said slide, said slide also including a downward projection adjacent the rear end thereof and to the rear of said upper slide flange for sliding line-contact engagement with said lower flange to pivotally support said rear end of the slide.

4. Apparatus as defined in claim 3 comprising a second channel-shaped body member in registering end-to-end abutment with said first-named body member, and cam means mounted on said second body member for operative cooperation with said slide to effect frictional engagement between said slide and said second body member in response to longitudinal movement of the slide from said first-named body member into said second body member.

5. In a construction form, first and second channel-shaped members in aligned end-to-end abutment, each said channel-shaped member comprising a web, an upper flange and a lower flange, cam means on said second channel-shaped member, and a slide slidably mounted in said first channel-shaped member and engageable with said cam means, said cam means and slide cooperating to effect frictional engagement of said slide and said second channel-shaped member in response to movement

of the slide into said second channel-shaped member, said slide having a downward projection adjacent the end thereof remote from the adjacent end of said first channel-shaped member, said projection being in engagement with the lower flange of said first channel-shaped member for pivotally supporting said end of the slide.

6. Apparatus as defined in claim 5 wherein the surface of said projection in engagement with said lower flange is convex.

7. In a construction form, a channel-shaped body member having a web and upper and lower flanges, and a locking slide mounted for sliding movement between said flanges, said slide having a downward projection from the lower edge thereof adjacent the end thereof remote from the adjacent end of said body member to pivotally support the slide on said lower flange and the uppermost part of said slide terminating in spaced relation to said end of the slide, whereby upon pivotal movement of the slide in one direction the uppermost part thereof moves into substantially flat engagement with said upper flange.

8. A construction form as defined in claim 7 wherein the uppermost part of the slide is a flange which is engageable with said upper flange.

9. In a construction form, first and second longitudinally alignable body members, each said body member being channel-shaped in transverse section and comprising a vertical web and upper and lower flanges at the upper and lower edges of the web, respectively, said upper flange having a down-turned edge portion forming a channel with said web, and means for aligning and connecting said body members comprising a sheet metal slide having a web parallel to and engageable with the webs of said body members when the latter are aligned and in end-to-end contact, a first flange at the upper edge of said slide web engageable with the upper flanges of said body members and slidably fitting between said vertical webs and down-turned edge portions, said slide web having a rearward extension beyond and wholly below said flange portion, a second flange at the forward end of said slide web having the lower edge thereof above the lower edge of said slide web, and a downwardly extending projection on said rearward extension to pivotally support the rear end of the slide on the lower flange of said first body member, a vertical guide plate secured to the lower flange of said first body member adjacent said slide web for longitudinally guiding said slide, a guide member on the lower flange of said second body member for cooperation with said slide, the upper surface of said guide member being inclined upwardly away from said first body member and engageable by the lower edge of said second flange during forward movement of said slide from said first body member into said second body member, whereby the forward end of said slide is lifted about said downwardly extending projection as a pivot to bring said first flange of the slide into engagement with the upper flanges of said body members.

10. A construction form as defined in claim 9 wherein said guide member diverges from the web of said second body member toward said first body member for cooperation with said slide web during forward movement thereof to effect alignment of the webs of said body members.

11. A construction form as defined in claim 10 wherein the surface of said guide member adjacent the web of said second body member is curved convexly toward said web.

12. Construction apparatus comprising a channel-shaped body member having a web, an upper flange and a lower flange, cam means fixedly mounted on said lower flange adjacent one end thereof, a second channel-shaped body member in end-to-end abutment with said first-named body member, and a locking slide mounted on said second body member, said cam means comprising

a piece of sheet metal mounted on edge on said lower flange, the upper edge of said piece being inclined away from the adjacent end of said first-named body member and the surface of said piece facing said web being curved convexly toward said web, said upper edge of said piece and said convex surface of said piece being adapted to be engaged by said locking slide.

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