June 10, 1941. C. G. WEBER 2,244,931

CONCRETE FORM

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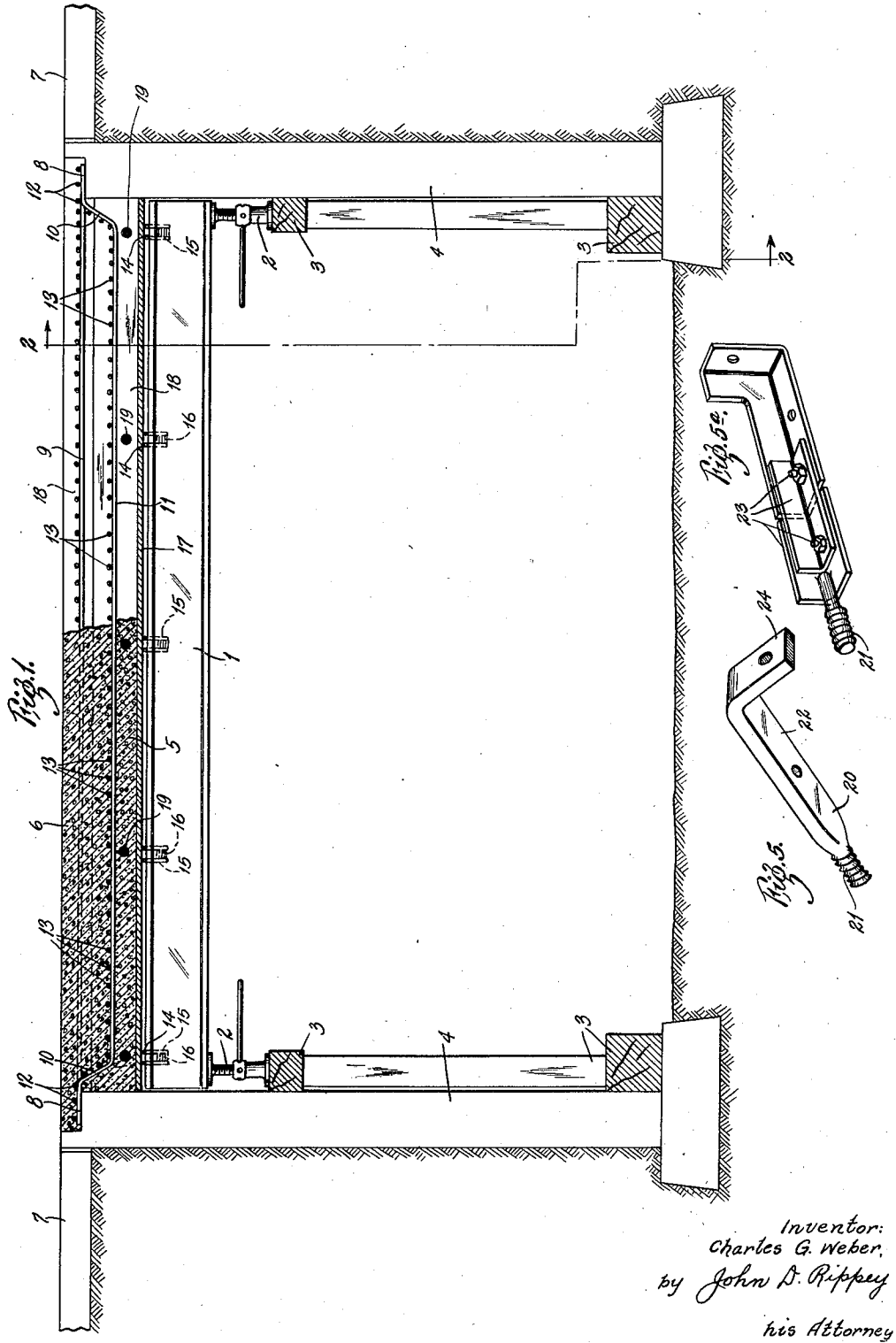


Fig. 1.

Fig. 5a.

Fig. 5.

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Fig. 2.

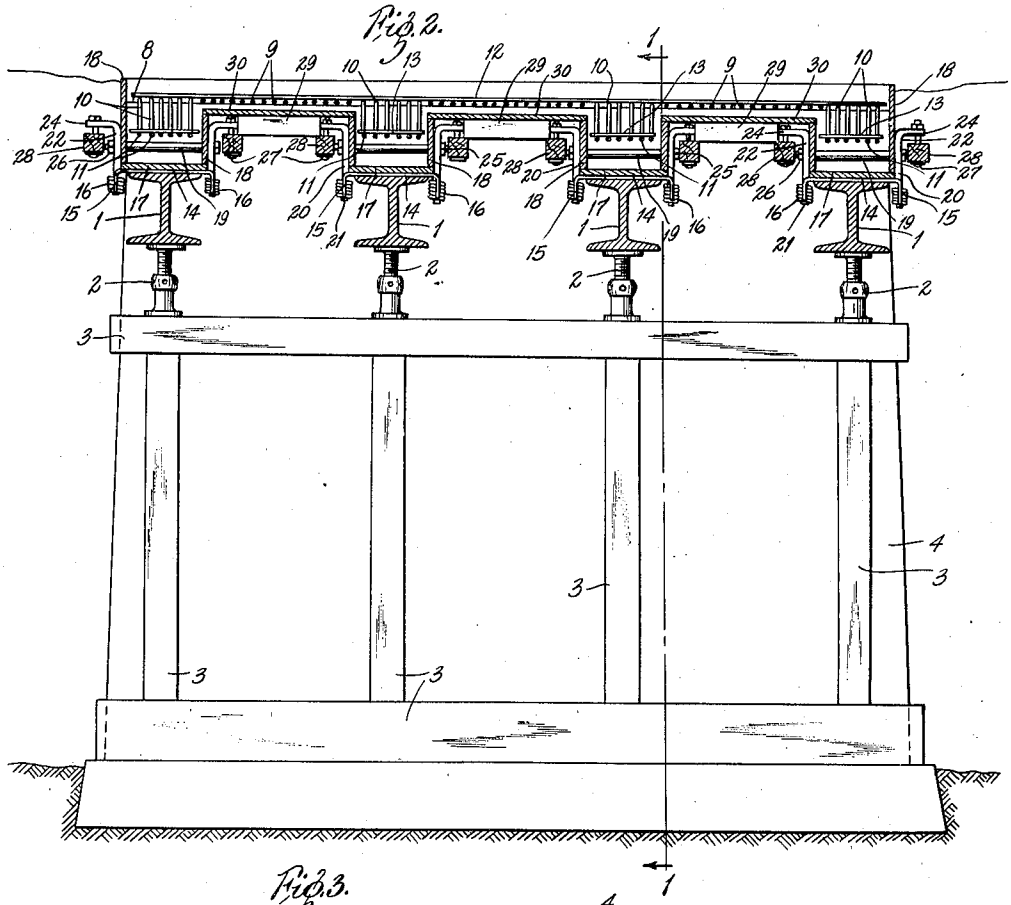


Fig. 3.

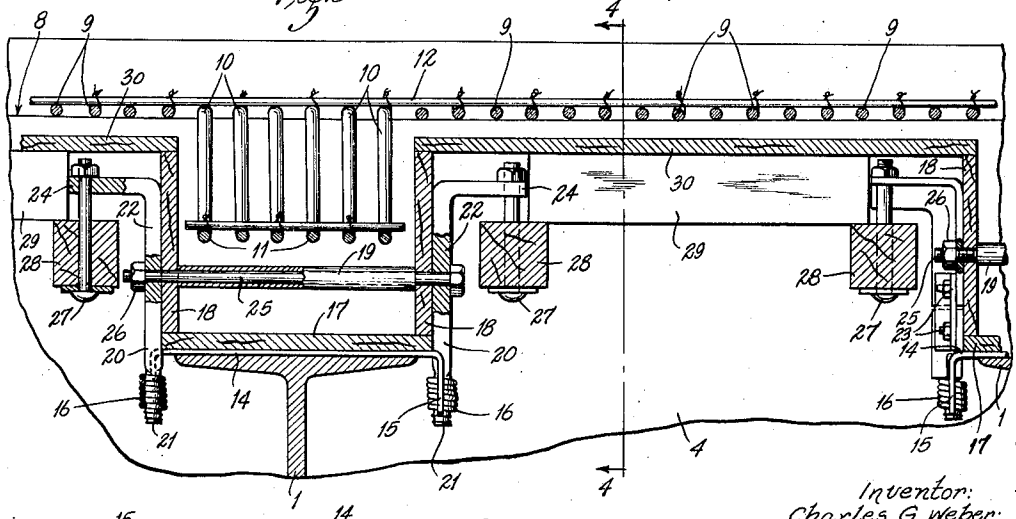
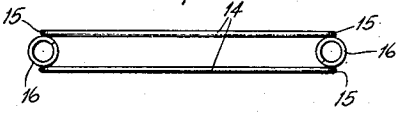


Fig. 6.



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Fig. 4.

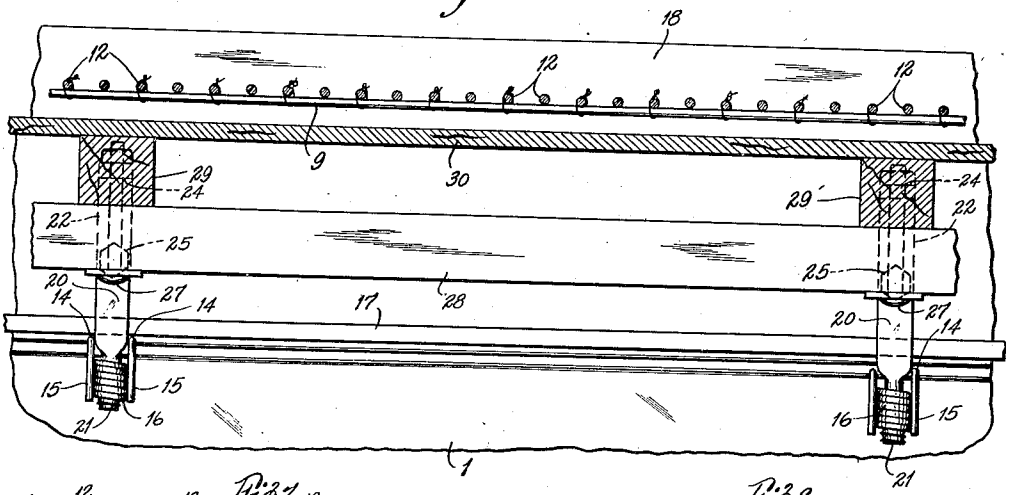


Fig. 7.

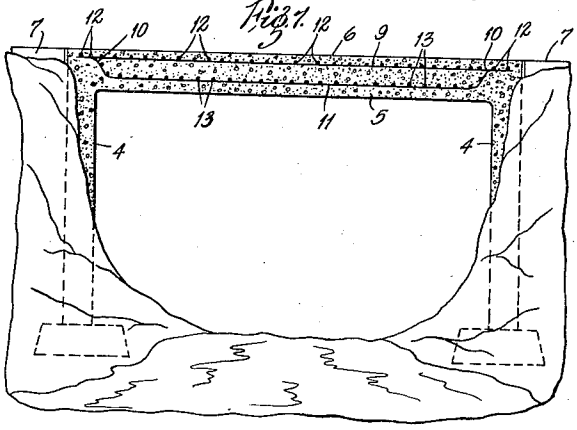


Fig. 8.

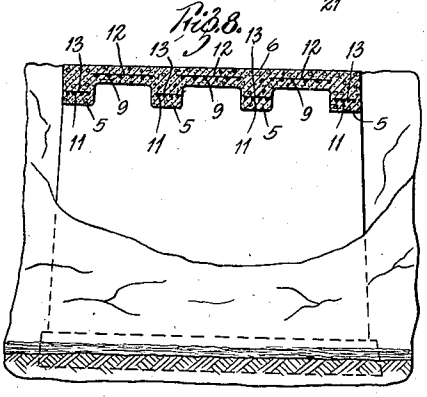
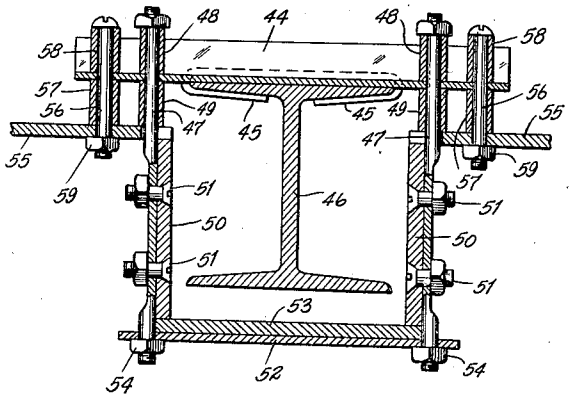


Fig. 13.



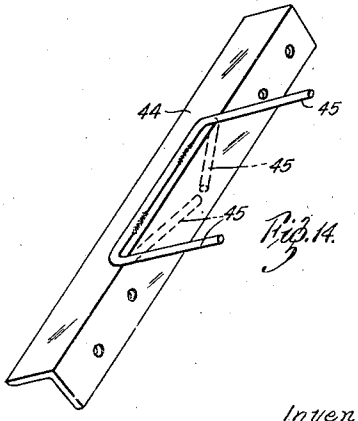


Fig. 14.

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Fig. 9.

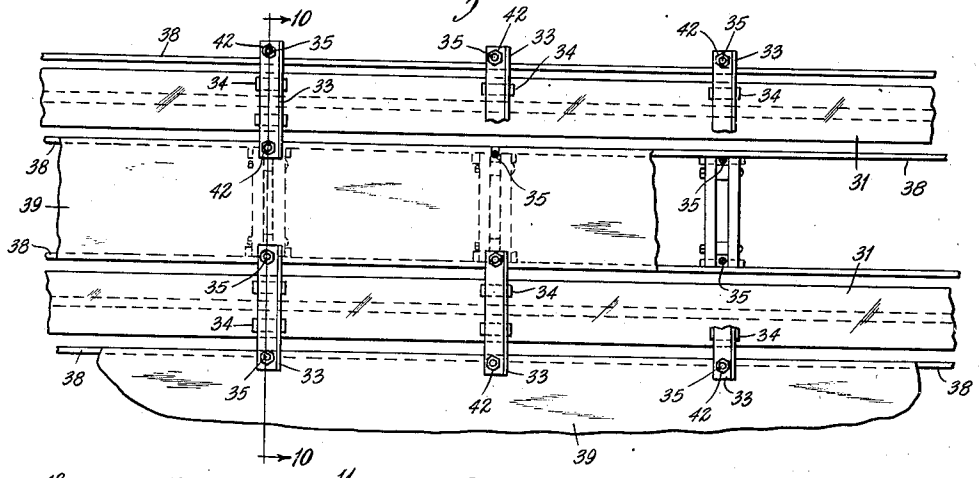


Fig. 10.

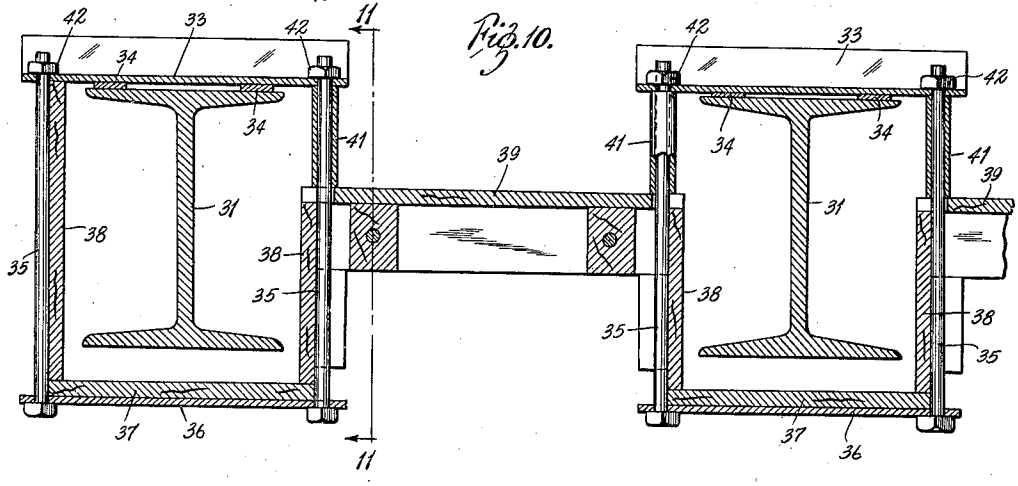


Fig. 11.

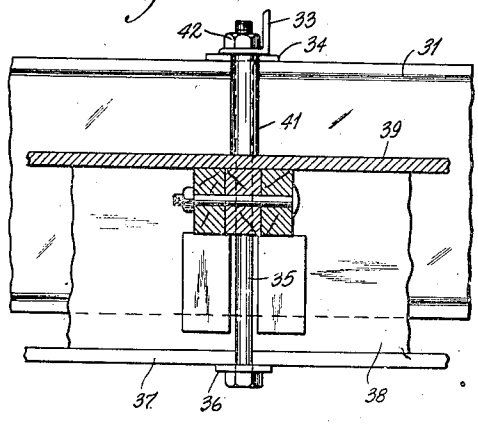
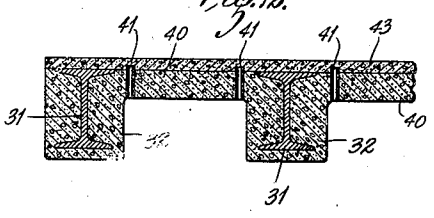


Fig. 12.



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Patented June 10, 1941 2,244,931

UNITED STATES PATENT OFFICE

2,244,931

CONCRETE FORM

Charles G. Weber, St. Louis, Mo.

Application July 13, 1939, Serial No. 284,196

6 Claims. (Cl. 25—131.5)

This invention relates to concrete forms for use in erecting concrete structures; and has special reference to forms for the erection of concrete structures having reinforced concrete beams.

Objects of the invention are to provide an improved concrete form including a number of spaced cooperating portions for shaping reinforced concrete beams connected by monolithic wall or pavement formation; to provide means for holding the elements of the forms in assembled relationship and permitting their ready detachment after the concrete has become hardened; to provide forms which dispense with the necessity of using intermediate supporting structure which becomes damaged as an incident to the erection and dismantling thereof; and to attain all of the other useful advantages herein made apparent.

Other objects of the invention will appear from the following description, reference being made to the annexed drawings, in which—

Fig. 1 is a vertical sectional longitudinal view on the line 1—1 of Fig. 2 showing a portion of a concrete viaduct made by use of my improved form, which is shown in connection therewith.

Fig. 2 is a vertical cross-sectional view on the line 2—2 of Fig. 1.

Fig. 3 is an enlarged sectional view showing the form for shaping the concrete beams and the detachable elements by which the form parts are held together.

Fig. 4 is a sectional view of the form on the line 4—4 of Fig. 3 before the concrete is placed.

Fig. 5 (Sheet 1) is a perspective view of one of the members used to support vertical and horizontal form parts.

Fig. 5*a* is a perspective view of a modified form of one of said members.

Fig. 6 (Sheet 2) is a plan view of one of the brackets by which the supporting members of Fig. 5 are supported.

Fig. 7 is a reduced view showing the concrete structure of Fig. 1 after the forms have been removed.

Fig. 8 is a sectional view similar to Fig. 2 after the forms have been removed.

Fig. 9 is a plan view showing a modified form construction.

Fig. 10 is an enlarged sectional view on the line 10—10 of Fig. 9.

Fig. 11 is a sectional view on the line 11—11 of Fig. 10.

Fig. 12 is a sectional view of a portion of the concrete structure made by use of these modified forms after said forms have been removed.

Fig. 13 (Sheet 2) is a sectional view similar to Fig. 10 showing still another modification of the form structure.

Fig. 14 is a perspective view of the supporting bracket shown in Fig. 13.

The form constituting the present invention may be used in the making of concrete structures of various types and for different purposes. For convenience, the invention is shown in use for making concrete viaducts, but such illustration of a specific use of the invention is not to be considered a limitation.

As shown, the metal beams 1 are supported by adjusting jacks 2 mounted on a removable frame work 3 and spanning the space between concrete side or facing walls 4 at opposite sides of a channel or water course. The beams 1 constitute rigid supports for the sectional form for supporting and shaping the concrete to provide concrete beams 5 extending across the space between the walls 4 and a pavement or floor 6 in monolithic connection with the beams 5 and in continuation of the road surfacing 7 beyond the walls 4. The beams 5 are needed in order to support the thinner pavement or floor 6 the ends of which extend onto supporting ledges 8 at the upper portions of the facing walls 4. Series of spaced reinforcing metal rods 9 are embedded in the pavement or floor portions 6 and have their ends extending onto and supported by the ledges 8 of the walls 4. Reinforcing metal rods have suspending portions 10 seated on the ledges 8 and beam reinforcing portions 11 embedded in the concrete beams 5 considerably below the reinforcing rods 9 and below the pavement or floor 6. Reinforcing cross rods 12 extend across the series of rods 9 and reinforcing cross rods 13 extend across each series of rods 11.

Each of the beams 1 supports a series of brackets which may be of different forms and shapes. As shown (Figs. 3 and 6), each bracket comprises a pair of rods 14 extending across a beam 1 and having downwardly extended ends 15 between which screw sockets 16 are attached. These screw sockets may comprise sections of coiled springs as shown, or be otherwise formed as desired. A bottom wall 17 is laid upon these brackets above each beam 1, and side walls 18 are supported along the respective sides of said bottom walls to provide forms for the concrete beams. Tubular spacers 19 placed at intervals between the side walls 18 hold said walls in

proper spaced relationship. Bracket sections 20 have threaded ends 21 screwed into the sockets 16 and are detachably secured to upper bracket sections 22 by connections 23, and are formed with lateral extensions 24 on their upper ends. Bolts 25 pass through the upper bracket sections 22, the walls 18 and the tubes 19, and have removable and replaceable nuts 26 screwed on their ends to hold the parts in assembled relationship as shown. Hanger bolts 27 extend through supporting beams 28 and through the arms 24, and cross members 29 have their ends seated on the beams 28. Form walls 30 rest upon the members 29 and upon the upper edges of the side walls 18.

After the concrete form has been assembled in this manner and in proper position between the facing walls 4, and after the reinforcing rods 9, 11, 12 and 13 have been located, the concrete is placed in the form to fill the beam forms and provide a pavement or floor 6 in monolithic connection with the beams and completely embedding all of the reinforcing rods. The upper surface of the pavement or floor 6 is then finished in proper continuation of the upper surface of the pavement 7. After the concrete has hardened, the jacks 2 may be operated to lower and permit removal of the beams 1, after which the sections 20 may be detached from the sections 22 and the bolts 25 removed, thereby permitting removal of all of the parts of the form. This leaves the tubular spacers 19 embedded within the concrete beams 5, which is not objectionable. The frame work 3, usually composed of wood, may then be removed without destruction thereof or serious damage thereto.

In the modification of the invention shown in Fig. 10, metal beams 31 are placed in position to be completely embedded in the concrete beams 32, thereby dispensing with the use of the supporting beams 1 and the reinforcing rods 11. Angular form supports 33 are supported upon removable strips 34 extending along the upper portions of the beams 31. Bolts 35 extend through holes in the ends of the cross members 33 and at their lower ends support cross members 36 complementary to the cross members 33. Bottom walls 37 are mounted on the cross members 36 between the bolts 35, and side walls 38 are placed against the inner sides of the bolts 35 and upon the bottom walls 37 to provide forms for shaping the concrete beams 32 that embed the reinforcing metal beams 31. Bottom walls 39 are supported by the bolts 35 and the walls 38 to support concrete between the beams 32 for forming the thinner pavement or floor portions 40 in monolithic connection with the beams 32. Above the bottom walls 39, the bolts 35 extend through tubular spacers 41 which remain embedded in the concrete and which permit easy removal of said bolts 35 after the concrete has hardened. After the concrete has been placed in the form thus provided and leveled off approximately even with the upper surfaces of the reinforcing beams 31, the form may be dismantled and removed by detaching the nuts 42 from the bolts 35 and withdrawing said bolts. Obviously, this permits removal of all of the form walls. Thereafter, a finishing surface 43 may be applied to the top of the monolithic concrete structure to embed the upwardly extended ends of the tubes 41 and cover the upper surfaces of the metal beams 31.

The form shown in Fig. 13 is a variation of the form shown in Fig. 10, and comprises cross members 44 having clamps 45 attached thereto and securely engaging the upper flanges of the metal beams 46 which are analogous to the metal beams 31. Bolts 47 extend through tubes 48 on the cross members 44 and through tubes 49 below said cross members 44, and are attached to side walls 50 by removable and replaceable fasteners 51. The lower ends of the bolts 47 pass through supporting members 52 complementary to the cross members 44 and which support bottom walls 53 for the concrete beams. Nuts 54 are screwed on the lower ends of the bolts 47 and may be removed to permit dismantling of the form after its use has been completed. Walls 55 extend across between the walls 50 of adjacent beam forms in order to support the concrete for the pavement or floor 40. Additional supports for these walls 55 comprise bolts 56 passing through said walls, through spacer tubes 57 below the cross members 44, and through tubular spacers 58 above said cross members 44. After the concrete has been placed to fill the beam forms and to provide the monolithic pavement or floor connection 40 up to the upper ends of the tubes 48 and 58 and has hardened, the form may be dismantled by removing the nuts 54 from the bolts 47 and the nuts 59 from the bolts 56, leaving the cross members 44 embedded in the concrete. This concrete construction may then be provided with a surfacing like the surfacing 43 or not, as desired.

My improved concrete form may be varied in many other ways than those specifically shown and described without departure from the nature and principle of the invention.

I claim:

1. A concrete form comprising a supporting beam, a bottom wall supported by said beam, side walls rising from said bottom wall, means supported by said beam and engaging said side walls for preventing outward movement of said side walls and for supporting a floor form wall, means between said side walls for preventing inward movement thereof and supports apart from said side walls for supporting said last named means.

2. A concrete form comprising a supporting beam, a bottom wall supported by and above said beam, two side walls rising from said bottom wall and cooperating with said bottom wall to provide a form adapted to receive concrete, means supported by said beam preventing outward movement of said side walls, devices located between said side walls for preventing inward movement thereof, and supports for said devices carried by said means.

3. A concrete form comprising a series of laterally spaced supporting beams, a bottom wall supported by each of said beams, side walls rising from said bottom walls and cooperating therewith to provide forms for shaping concrete beams above said first named beams, form walls apart from said side walls extending across the spaces between adjacent side walls for supporting concrete in monolithic union with the concrete rising above said side walls, and means supported by said first named beams for preventing lateral displacement of said side walls and for supporting said last named walls respectively.

4. A concrete form for making a viaduct or the like comprising a series of laterally spaced supporting beams extending longitudinally of the viaduct to be made, a bottom wall supported by each of said beams, side walls rising from said bottom walls and cooperating therewith to provide forms for concrete beams extending across the viaduct above said first named beams, form walls apart and detachable from said side walls

extending across the spaces between adjacent ones of said side walls for supporting a concrete pavement in monolithic union with said concrete beams, and means supported by said first named beams for preventing lateral displacement of said bottom walls and said side walls and for supporting said form walls respectively.

5. A concrete form comprising a series of laterally spaced beams, a bottom wall supported above each of said beams, side walls rising from said respective bottom walls and cooperating therewith to provide forms for concrete beams above and parallel with said first beams, form walls extending across the spaces between adjacent ones of said side walls for supporting concrete in monolithic union with said concrete beams, supporting members carried by said first beams holding said side walls from lateral displacement away from each other, and means carried by the upper ends of said supporting members for supporting said form walls.

6. A concrete form comprising a series of laterally spaced beams, a bottom wall supported above each of said beams, side walls rising from said respective bottom walls and cooperating therewith to provide forms for concrete beams above and parallel with said first beams, form walls extending across the spaces between adjacent ones of said side walls for supporting concrete in monolithic union with said concrete beams, supporting members carried by said first beams holding said side walls from lateral displacement away from each other, means carried by the upper ends of said supporting members for supporting said form walls, spacers located between said side walls preventing inward displacement of said side walls, and detachable means supported by said supporting members for holding said spacers in position before and during the placing of the concrete.

CHARLES G. WEBER.