United States Patent [19]

Gates

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[54] **CONCRETE POURING FORM PANEL**

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[52] **U.S. Cl.** **249/40;** 52/577

[51] **Int. Cl.²** **E04G 11/08**

[58] **Field of Search** ..... 249/2, 6, 33, 190, 192, 249/207, 213, 216, 11, 12, 22, 30, 34, 4, 91, 5, 83, 84, 85, 90, 148, 217, 218, 35–48; 264/31, 35; 25/118 H, 118 W, 118 T, DIG. 22, DIG. 30; 52/373, 374, 576, 577, 587, 699, 712; 425/63–65

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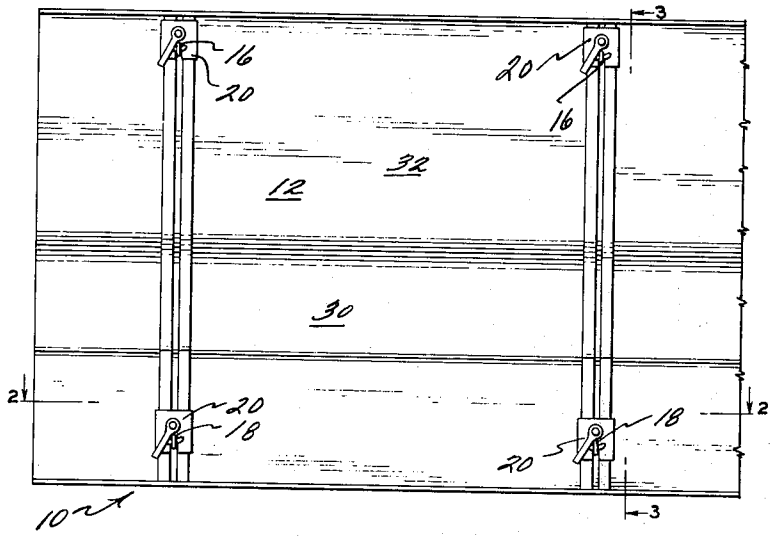
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[57] **ABSTRACT**

This invention relates to a free-standing upwardly-convergent pouring form for poured concrete wall structures that includes a pair of upstanding form panels held in fixed spaced relation both top and bottom by a plurality of transverse tie members and an anchor member suspended from said form panels above the ground in position to receive wet concrete poured therebetween. The invention also contemplates the improved method of anchoring a free-standing upwardly-convergent concrete pouring form to the ground which comprises pouring a portion of the wet concrete onto the top of an anchor member suspended above ground level between the form panels so that the concrete resting atop said anchor member will overbalance the hydrostatic forces tending to lift the forms as they are filled.

6 Claims, 3 Drawing Figures



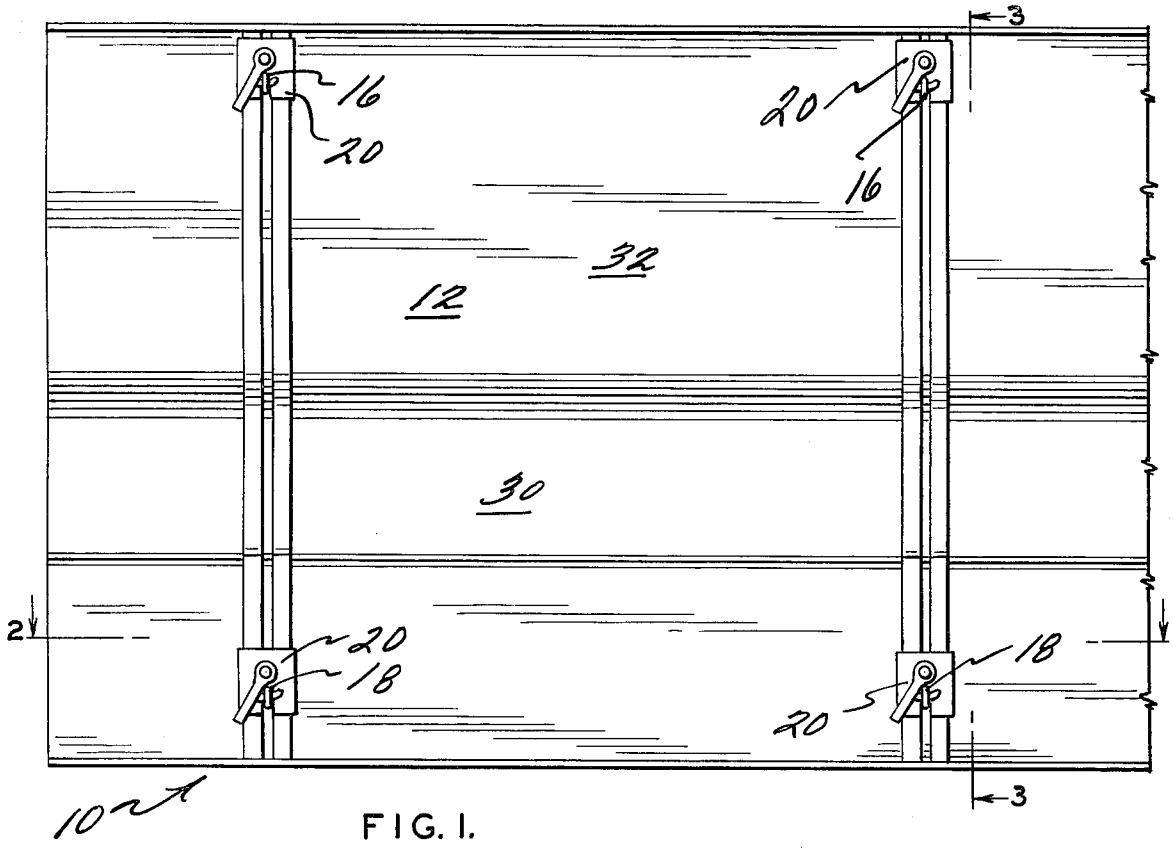


FIG. 1.

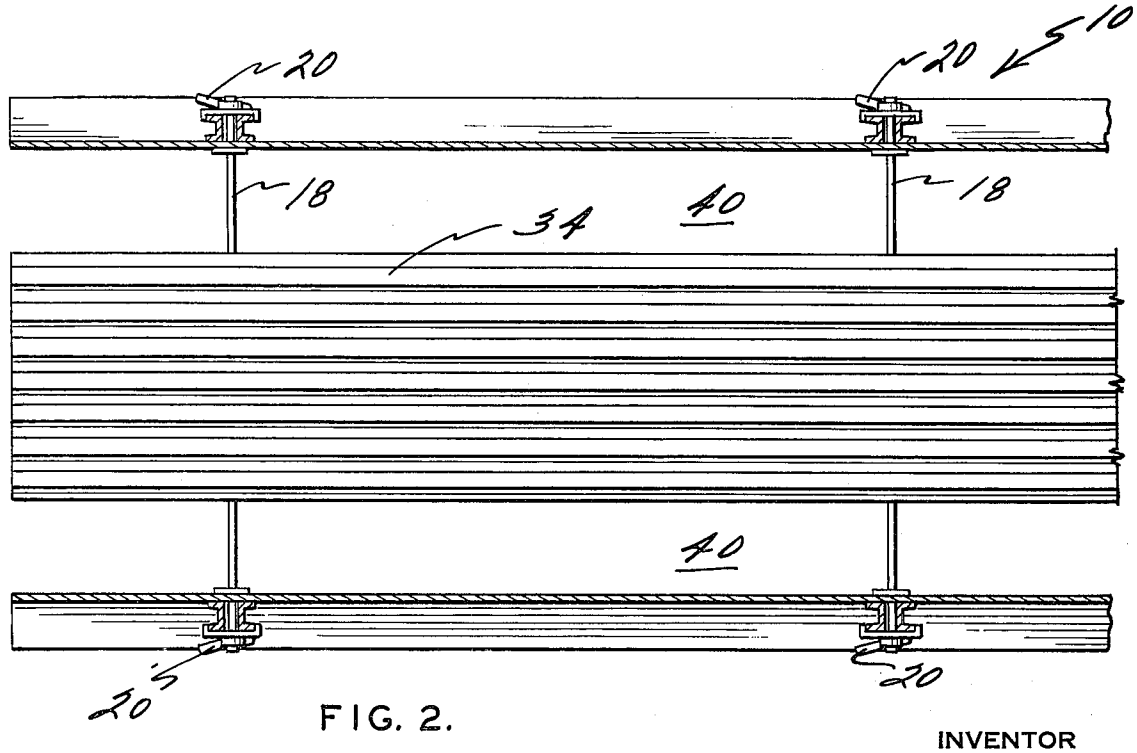


FIG. 2.

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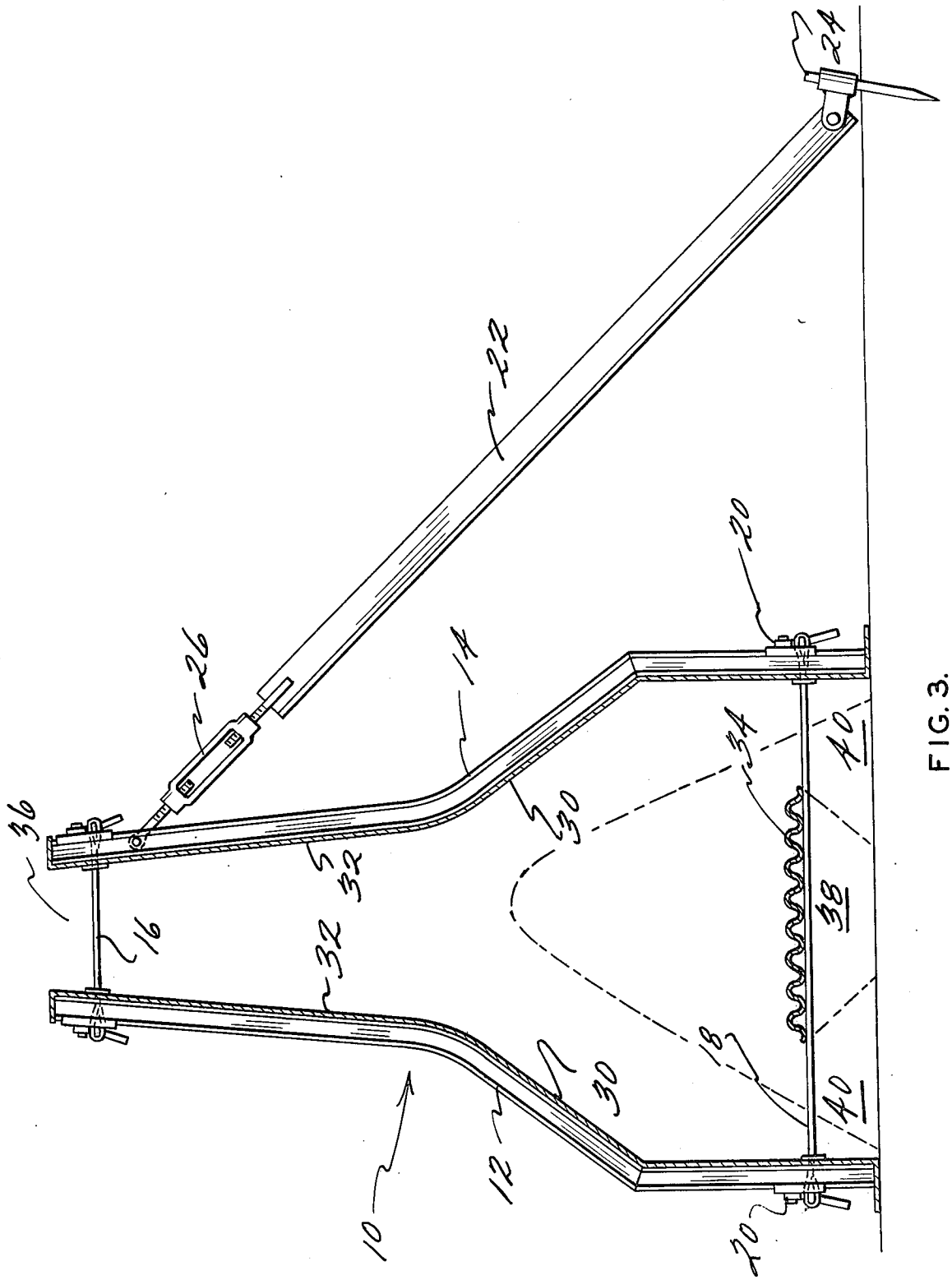


FIG. 3.

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CONCRETE POURING FORM PANEL

Concrete pouring forms having upwardly-convergent portions must be securely anchored to the ground or a footing, otherwise, the hydrostatic forces developed when the wet concrete presses up against those overhangs will lift the forms off their foundations allowing the concrete to escape therebeneath. Fastening these pouring forms to the ground securely enough to resist the substantial lifting forces exerted thereagainst is extremely difficult to do, especially in sandy soil and the like. Even in firm clay soil, a rain can loosen the anchor stakes sufficiently to permit the forms to lift up under the loads exerted thereagainst by wet concrete.

Certainly one of the main problems, however, is the tremendous amount of time involved in attempting to anchor these forms tightly down onto the ground. Stakes must be driven deeply into the ground at an angle every few feet through suitable apertures provided for this purpose along the base of the form panels and then removed again before the forms can be stripped. While the forms still may have to be anchored against lateral movement, this is a simple matter and relatively fast compared with fastening them down.

It has now been found in accordance with the teaching of the instant invention that these and other problems associated with the erection of wall structures having upwardly facing ledges or inclined portions can, in large measure, be eliminated by the simple, but unobvious, expedient of suspending an anchor member inside the forms above the ground in position to receive atop thereof a good deal of the concrete initially poured therein which will act as a ballast to prevent the remaining mass of concrete from lifting said forms off their foundation. It is sufficient that the combined weights of the forms themselves, the anchor member and the concrete supported atop the latter exert a downwardly-directed force at least equal to the counteracting vertical forces the wet concrete will exert when it presses upwardly against the overhanging portions of the form panels. These weights may, of course, be distributed among the three elements in a variety of different ways including relying on the weight of the forms themselves or the forms plus the anchor member to do the job; however, obviously, from the standpoint of practicality, maximum advantage should be taken of the weight of the concrete which must be there anyway consistent with the other requirements necessary to produce a good poured concrete wall structure. The placement, size, shape and manner of suspending the anchor member can, likewise, vary considerably and still produce the desired end result; but here, once again, practical considerations suggest certain ways of doing the job that are preferable to others from both the standpoints of time and expense as will be pointed out presently.

It is, therefore, the principal object of the present invention to provide a novel and improved method and apparatus for anchoring free-standing upwardly-convergent pouring forms to the ground or other foundation while wet concrete is poured therein.

A second object is to provide a method for the purpose aforementioned that results in tremendous savings in both labor and materials.

Another objective of the invention herein disclosed and claimed is to provide an extremely simple and inexpensive anchor member that may even be made from waste material.

Still another object is to provide a method for suspending the anchor member from the form panels that utilizes the tie members used to hold the latter in fixed spaced relation as the supports therefor.

An additional object is the provision of a form-anchoring apparatus that remains with the poured concrete wall structure and, therefore, requires no stripping while adding reinforcement thereto.

Further objects are to provide a concrete pouring form anchor that is easy to use, versatile, requires no special skill, is readily available in many sizes and shapes, and one that can be quickly adapted to various pouring forms without interfering with the normal use thereof.

Other objects will be in part apparent and in part pointed out specifically hereinafter in connection with the description of the drawings that follows, and in which:

FIG. **1** is a fragmentary side elevation showing a type of upwardly-convergent pouring form used in the fabrication of poured concrete barricades;

FIG. **2** is a horizontal section taken along line **2—2** of FIG. **1** showing an anchor member laid atop a pair of the tie members in the lower row thereof; and,

FIG. **3** is a vertical section taken along line **3—3** of FIG. **1.**

Referring next to the drawings for a detailed description of the present invention, reference numeral **10** has been selected to designate broadly the pouring form which will be seen to include in the particular form shown a pair of panels **12** and **14** that happen to be identical and which are maintained in fixed-spaced free-standing relation by upper and lower rows of transverse tie members **16** and **18,** the opposite ends of which are releasably connected to their respective panels by latches **20.** As illustrated, the panels **12** and **14** are not fastened to the ground although the entire form is braced against sidewise movement by an angularly-disposed brace **22** staked into the ground at the lower end thereof by stake **24** while its upper extremity is adjustably fastened to one of the panels near the top thereof by a turnbuckle **26.**

All of the above is, of course, old in the art of concrete pouring forms. In addition, however, the prior art teaches anchoring upwardly-convergent pouring forms to the ground with stakes or the like to keep them from lifting when the concrete poured therein rises up and presses against the overhanging portions **30** of the panels or any other inwardly inclined surface thereof such as face **32.** As used herein, the term "upwardly-convergent" is intended to refer to a pouring form wherein at least one, and perhaps both, of the panels include an overhanging surface (**30** and **32**) against which the wet concrete will press as it fills the space therebetween and exert an upward force tending to lift it off the ground, a footing or other foundation.

In accordance with the teaching of the instant invention, the form is anchored by piling wet concrete atop an anchor member **34** suspended from said form in spaced relation above the ground. This anchor member is located beneath the opening **36** through which the concrete is poured so as to catch a portion thereof before it can reach the ground. In addition, by catching some of the wet concrete, the anchor member creates a void **38** therebeneath into which it can sag without touching the ground or other support. Since the resulting poured concrete wall structure (not shown) defined

by the form must rest on the ground, footing or like supporting foundation, a space **40** must be provided along both sides of the anchor member where the concrete can spill over the edges thereof and reach the ground. The slump characteristics of wet concrete are such that it will rarely ever completely fill the void **38** beneath the anchor member and it should never do so if said anchor member is of substantial width and the concrete is not vibrated or otherwise agitated to force it into this void. Obviously, the concrete is going to assume an angle of repose where a portion thereof will move into position beneath the side edges of the plate but this is of no significance so long as the weight of the anchor member and concrete resting thereon is borne by the form **10** rather than being transmitted to the foundation or other support for the latter.

As far as anchoring alone is concerned, the anchor member could probably be hung in the top of the form and function just about as well; however, it would certainly interfere with the pouring operation and make it a good deal more difficult to fill the space between the form panels. Accordingly, it is much more practical to locate the anchor member near the bottom of the form as shown.

Similarly, the manner of suspending the anchor member between the form panels is not especially critical, yet, to employ special hangers for this purpose would be wasteful of material when the tie members **18** are already there being used to maintain the form panels in fixed spaced relation and they can easily be used to serve the secondary function as supports for the anchor member **34.** In so doing, however, it may be necessary to relocate the row of tie members (**18**) that are to function as supports for the anchor member higher up on the form panels so as to leave ample space therebeneath to accommodate any sag in the assembly due to the weight of the concrete without touching the ground. In the particular form illustrated, the anchor member comprises an elongate panel of corrugated material which will withstand a considerable load without appreciable bending. Sheets of corrugated material like that shown along with many other types of material suitable for use as the anchor member can often be found as scrap or waste of some sort. Since the anchor member remains cast in the wall structure as a permanent part thereof, an inexpensive piece of material should be used whenever possible unless it is also to function as a reinforcing member in which case the latter requirement may govern its shape and cost. While on this subject, it is well to recognize the obvious fact that the weight of the form itself could, of course, be made great enough to overbalance the hydrostatic lifting forces and thus dispense altogether with the need for the supplemental anchoring. On the other hand, the combined weights of the form and anchor member can be made great enough to counterbalance the lifting forces; however, in both of these instances, one is sacrificing the advantage of utilizing the already available concrete as ballast in favor of heavier, and presumably more expensive, hardware.

Accordingly, the present invention contemplates the use of the ordinary upwardly-convergent pouring forms such as are required to retain the concrete without reference to their incidental contribution as part of the anchoring ballast. Likewise, the anchor member should be selected on the basis of the minimum required from a cost standpoint to support a mass of concrete of sufficient weight when added thereto and to the weight of the form that will exert a downward force at least equal, and preferably much greater than the hydrostatic lifting forces to be exerted thereon.

Finally, some mention should be made of the shape, size and arrangement of the anchor members. It must, obviously, be shaped and located within the form so as to support a mass of concrete atop thereof. A plate laid flat will work fine while one laid on edge is obviously useless. Following this analogy, one with sides sloping outwardly will catch very little while one with inwardly-sloping sides defining some sort of a trough will function satisfactorily but not as well as a flat plate of the same area. Hence, no advantage is realized in going to unusual shapes except, as already noted, that of increased load-bearing capacity. A plain flat plate will bend too easily under load to be of much value unless fabricated from unusually heavy stock; therefore, one of the well-known load-bearing cross sections like the corrugated one illustrated is preferred.

The width, of course, depends to some extent on the space available between the form panels as a substantial gap must be left along both sides of the anchor member for the concrete to spill over onto the ground. A better way to look at the problem is that the total supporting area of the anchor member must be great enough to support a mass of concrete, the weight of which when added to the combined weight of the form and anchor member will counterbalance the lifting forces. Thus, the dimensions can be varied and still provide the same supporting area. Obviously, the unit must be long enough to bridge the gap between adjacent tie members in the same row or such other hangers as may be used so this parameter coupled with the available width between the form panels will usually define a workable area for the anchor member. As a practical matter, of course, these lifting forces are not of great magnitude and it doesn't take very much concrete which is quite dense and heavy to overbalance them. For example, a pouring form like that illustrated will develop lifting forces that can easily be counterbalanced by an anchor member in the form of a plate several inches wide and extending the length of the pouring form section.

As far as length is concerned, the anchor members needn't be continuous and considerable space can be left between adjacent ends thereof. They should, of course, be located within the form in position such that the downwardly directed force on each portion thereof is sufficient to counterbalance the lifting forces. In other words, it obviously isn't going to work in accordance with the teaching of the instant invention if most of the ballast is concentrated at one end and not enough at the other to hold it down. The required load distribution can be accomplished in several ways among which are distributing it evenly throughout the length of the form, concentrating it at the ends or center, or bridging the joints between adjacent form sections therewith.

I claim:

1. The free-standing form for poured concrete wall structures which comprises:

a pair of upstanding panels cooperating with the support therefor to define an open-topped cavity adapted to receive and retain wet concrete, at least one of said panels having an inwardly-extending overhanging portion;

upper and lower rows of transverse tie members arranged in longitudinally-spaced relation interconnecting the panels and adapted to maintain a fixed spaced relation therebetween, said lower row of tie members being spaced above the supporting surface upon which the panels rest; and,

means defining an anchor member suspended from the panels into the cavity therebetween in position to receive a portion of the wet concrete poured into the open top thereof, said anchor member including a horizontally-disposed upwardly-facing surface of substantial width defining a supporting area adapted to carry a sufficient weight of concrete which when added to the weight of the pouring form assembly thus formed will counterbalance any lifting forces generated when said wet concrete presses upwardly against said overhanging portion.

2. The free-standing concrete pouring form as set forth in claim **1** in which: the lower row of tie members provide the support for the anchor member that suspends the latter within the cavity between the form panels.

3. The free-standing concrete pouring form as set forth in claim **1** in which: the anchor member comprises an elongate relatively rigid sheet of a width substantially less than the horizontal distance separating the adjacent form wall surfaces alongside thereof.

4. The free-standing concrete pouring form as set forth in claim **3** in which: the anchor member is of a length greater than the longitudinal distance separating adjacent tie members in the bottom row thereof.

5. The free-standing concrete pouring form as set forth in claim **3** in which: the anchor member is transversely corrugated.

6. The free-standing concrete pouring form as set forth in claim **4** in which: the anchor member is of a length approximating that of the panels.

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