

Feb. 13, 1968

J. L. LOWERY

3,368,320

REINFORCING BAR AND FRAME SUPPORTS

Filed June 28, 1965

2 Sheets-Sheet 1

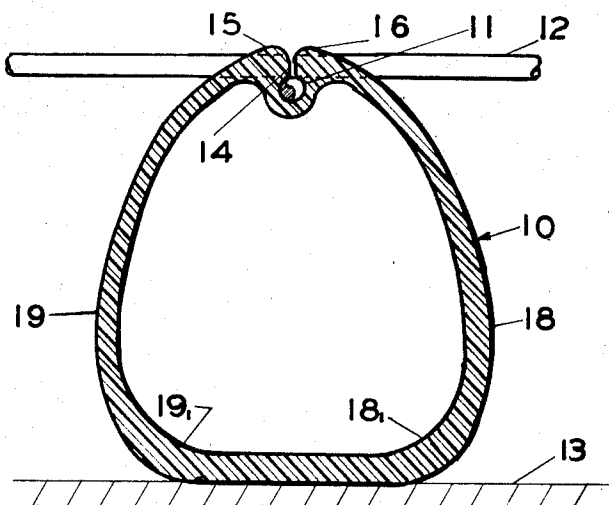


FIGURE 1

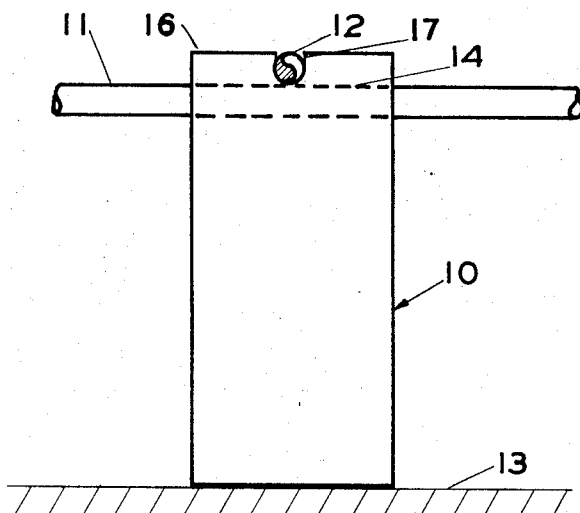


FIGURE 2

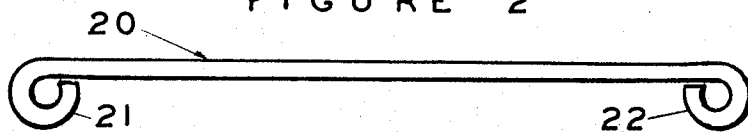


FIGURE 3

INVENTOR
JOHN L. LOWERY

ATTORNEY
E. A. Proctor

Feb. 13, 1968

J. L. LOWERY

3,368,320

REINFORCING BAR AND FRAME SUPPORTS

Filed June 28, 1965

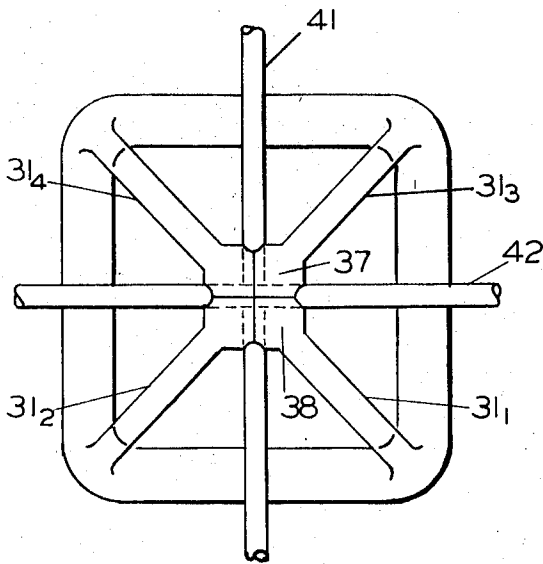


FIGURE 6

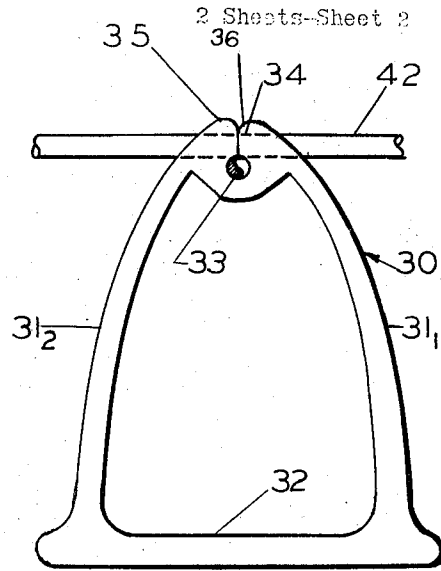


FIGURE 5

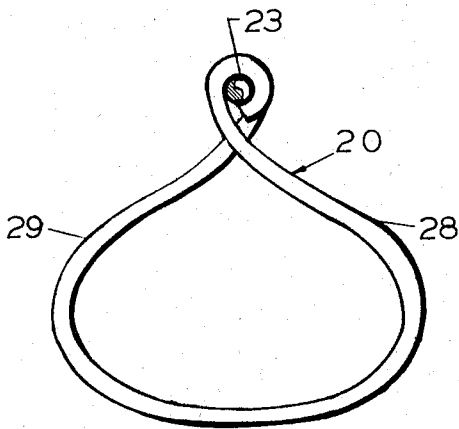


FIGURE 4

INVENTOR
JOHN L. LOWERY
ATTORNEY
L. A. Proctor

1

3,368,320

REINFORCING BAR AND FRAME SUPPORTS

John Leslie Lowery, 955 Magnolia Woods Ave.,
Baton Rouge, La. 70808

Filed June 28, 1965, Ser. No. 467,659

14 Claims. (Cl. 52-684)

ABSTRACT OF THE DISCLOSURE

The present invention contemplates a support for positioning and maintaining a rigid reinforcing bar in preselected elevated position above a bearing surface for formation of a slab construction. The support comprises a member having a surface for support of the reinforcing bar, a base, and a plurality of legs extending outwardly and generally radially downwardly between the support surface and the base. The legs of the member are constructed of a resilient material, preferably plastic of specified types as characterized herein, so that application of a downwardly directed unbalanced force upon the rigid reinforcing bar will cause the legs of the support to deform and produce downward displacement of the bar, and removal of the applied force after such deformation will cause the legs to rebound to their initial condition and return the bar to its original preselected elevated position.

This invention relates to reinforcing bar supports. In particular it relates to supports useful for positioning and maintaining in place rigid metal frameworks, grids, wires or bars which serve as skeletal reinforcing members for slab constructions of cement and other plastic compositions which solidify upon setting.

In various constructions, reinforcing wire fabrics, rigid metal bars, grids and frameworks are employed as skeletal reinforcing members for cement and other plastic compositions. These members are necessary for strengthening the finished compositions since e.g. concrete per se is weak when placed in tension whether the tensile stresses result from imposed loads, thermally induced changes or solidification upon setting.

It is generally the practice to lay out or form a rigid iron framework or grid and then to pour the wet concrete over the grid. Upon the setting of the concrete a slab construction is completed. A proper slab construction presupposes that the grid is properly positioned within the slab. For best results, the grid must not only be covered by the concrete, but after setting the grid should lie close to the face of the slab wherein the greatest protection from stress is needed. In a slab construction which rests upon the ground, for example, it is best that the grid lie close to the exposed face of the slab to prevent cracking of that face or surface.

It is often the practice in such constructions to position a grid a few inches above the ground by resting the grid upon or attaching the grid to rigid supports or chairs. Sometimes the grid is even supported in such positions by use of segments of brick or brick supports. Unfortunately, however, in actual practice the grids do not remain in their initially arranged preselected positions. For example, workers often walk upon the grid, and before or during the pouring of the concrete portions of the grid are bent or pressed close to the ground. Grids, especially lightweight grids, are bent about rigid supports. The supports themselves are often pushed into the ground. Often also, supports are pushed through waterproof membranes placed next to the slab for its protection. In attempts to at least partially remedy such defects workers sometimes try to pull the grid upwardly back into position or straighten the grid before the concrete has set. Such efforts are generally only partially successful at best and

2

thermal contractions, expansions and other stresses often cause the slab to crack.

Prior art chair devices for supporting rigid bars and frames have in general been so unsuccessful and impractical that they are often as not ignored and the rigid bars and frames laid directly on the ground to be covered with concrete.

In view of these and other prior art deficiencies, it is accordingly the primary objective of the present invention to provide new and novel bar supports for supporting, positioning and maintaining rigid reinforcing bars, grids or frameworks in place prior to and during the pouring and setting of concrete or other plastic compositions thereupon to form slabs. In particular it is an object to provide supports which will tend to prevent distortion or bending of the reinforcing wire or bars, welded wire mesh grids or frameworks upon application of a deforming force. More particularly, it is an object to provide such supports which will not tarnish or rust so as to prevent the soiling of the face of a finished slab or slab-like member, the lower face of which is subject to view. It is also an object to provide supports which can be readily and conveniently fabricated by extrusion and injection molding techniques. Further, it is an object to provide combinations of rigid reinforcing devices and supports.

These objects and others are achieved in accordance with the present invention which contemplates a resilient support, or plurality of such supports, adaptable for holding and supporting rigid reinforcing wire or bars, welded wire mesh, frameworks or grid members in preselected elevated position. Preferably a plurality of the resilient supports are used in conjunction, and each is provided with an upper supporting surface which can be affixed to a reinforcing bar. Each of the resilient supports is also provided with base portions which consist of or include a plurality of resilient legs, i.e. at least a pair, diverging or extending generally radially and downwardly away from the supporting surface and terminating in a generally common plane for resting upon a bearing surface. When a reinforcing rod, grid, or framework is supported by its being resting upon or having been affixed to the upper supporting surfaces of a number of these supports, of similar sizes, the structure will be supported a preselected distance above and generally parallel to the bearing surface upon which rests the legs of these resilient members. A force exerted upon the reinforcing rod, grid or framework can cause the legs of the supports to deform or bend generally outward so that the reinforcing members will be displaced in the direction of applied force. This displacement prevents distortion or bending of the reinforcing member beyond the elastic limit of the materials of which the reinforcing member is constructed and, upon removal of the force the support will recover its initial shape and return the reinforcing member to substantially its original position.

The legs of the supports are preferably spaced apart but joined together, either directly or by a web or other member which permits the terminal ends of the legs to remain in relatively fixed position while the midsections thereof bow generally outwardly when a deforming force is applied. By such limited outward movement of the mid portions of the legs a greater potential force is utilized for return of the support, and consequently the reinforcing bar, to its original position upon removal of the deforming force. Moreover, the legs are not imbedded within the bearing surface.

Supports which are constructed of resilient plastics offer outstanding advantages. These structures do not tarnish or rust and can be formed e.g. by extrusion and injection molding, in various shapes and then used as initially formed or reshaped upon attachment to the rigid reinforcing bars, grids or frameworks for the support thereof.

The resilient plastic compositions most suitable for use in accordance with the present invention are those low density, high molecular weight polymers having a crystalline or partially crystalline structure. Generally the molecular weight of the polymer should range from about 50,000 to about 100,000, and higher, and the degree of crystallinity at least about 10 percent, or higher. More preferably, however, the molecular weight ranges from about 100,000 to about 200,000, and above, and crystallinity ranges from thirty to about seventy percent, and above. Such plastics can be modified by the addition of stabilizers, molding powders and the like to provide the proper resiliency. Polyvinylchloride and polypropylene are particularly satisfactory in the practice of this invention. Such plastic compositions can be extruded or molded in a variety of sizes and shapes, and are particularly suitable from a cost-effectiveness standpoint. An advantage of such plastics is that, generally, even off specification products can be used quite effectively. Iron and steel springs, however, can be used.

The invention will be better understood by reference to the attached drawings and to the detailed description which makes reference thereto.

In the drawings:

FIGURE 1 is a preferred resilient support shown in cross-section, supporting a rigid reinforcing frame which is to be incorporated in a slab construction,

FIGURE 2 is a side view of the embodiment described by reference to FIGURE 1,

FIGURE 3 is a member which can be conveniently shaped into a resilient support,

FIGURE 4 is the member shown by reference to FIGURE 3, shaped into a resilient support for a rigid reinforcing frame,

FIGURE 5 is another form of support shown in elevation, and

FIGURE 6 is the support of FIGURE 5 shown in plan.

Referring to FIGURE 1 is shown in cross-section a preferred resilient plastic structure 10 manufactured as by extruding a plastic composition through a die having an extrusion annulus conforming to the shape of the cross-section. The plastic material can be extruded as a continuous tubular body and then sliced or cut into any desired thickness to form the desirable plastic structures.

The plastic structure 10 is provided with an upper snap fastening surface which can be engaged with a segment of a rigid reinforcing bar 11, or segment of frame comprised of a plurality of rigid bars 11, 12 to support same in spaced parallel relation with a bearing surface 13. The snap fastening surface consists of an opening or channel 14 which acts as an upper support surface for rigid reinforcing bar 11. As will be noted, the channel 14 is formed in part by a pair of lobes 15, 16 which encircle and enclose reinforcing bar 11. The latter is initially positioned upon the support 10 by pressing the bar 11 downwardly into opening 14 forcing or spreading apart members 15, 16 which snap back together after the bar 11 has passed and is in the position shown. As shown by reference to FIG. 2, a simple upper groove 17 which acts as a support surface can also be provided for support of a second bar 12 perpendicular to the first.

The bars 11, 12 can thus be provided and maintained at a preselected height above bearing surface 13 by use of supports 10 of desired size. If a downward force is exerted upon the bars 11, 12 the "legs" 18, 19 will bow outwardly while bars 11, 12 are displaced downwardly and closer to bearing surface 13. The lower portions 18, 19, will not spread apart because these are actually joined together. Upon removal of the applied force the whole plastic body 10 and legs 18, 19 will regain or return to its original undistorted shape and the bars 11, 12 will be returned to their original position. A feature of the structure 10 also is that concrete or other plastic material can be poured about the member to cover it along with the reinforcing bars 11, 12 but there will be no necessity to

remove the structure 10 prior to setting. The member 10 thus remains permanently within the finished slab construction. Where the lower face of slab construction is to be exposed to view the support will not corrode, rust or tarnish so as to deface the exterior surface of the set form.

FIGURE 3 shows a support structure 20 having end portions 21, 22 for fastening upon a reinforcing bar or frame. These structures 20 can be readily formed by extruding a mass of desired cross-section. The plastic mass can then be sliced into structures of desired thicknesses. These shapes, or structures 20, can then be attached upon a rigid reinforcing bar 23 by simply bringing the ends together to form an oval, and then attaching the end portions 21, 22 upon a bar 23 as shown by reference to FIGURE 4. A feature of these supports 20 is that rigid reinforcing bar 23 is less prone to kink the legs 28, 29 on extreme downward displacement thereof because members 28, 29 are free to slip apart slightly in yielding to bar 23.

Referring to FIGURES 5 and 6 is shown another support form conveniently made by injection molding. The support 30 consists of four diverging legs 31, 31₂, 31₃, 31₄ extend inwardly and join together at the top or apex to form a reinforcing frame support surface. The reinforcing frame support surface consists of channel openings 33, 34—viz a lower channel opening 33 formed between the lobe members 35, 36 and an upper channel opening 34 formed between lobe members 37, 38. The lower bar 41 and upper bar 42 rest in lower channel 33 and upper channel 34, respectively. An unbalanced downward force to cause displacement of bars 41, 42 will cause legs 31 to flex outwardly, and removal of the deforming force will permit return of the bars 41, 42 to their initial position by the thrust exerted by legs 31 rebounding to their initial unflexed condition.

In the construction of a slab for a building several steel wire fabric sheets 8 feet wide and 18 feet long are draped upon low density, high molecular weight polypropylene supports of configuration similar to that described by reference to FIGURES 1 and 2. The supports, which rest on the ground, are three and one-half inches high, each of the legs of the supports is one-half inch cross-sectional diameter, and the supports are separated one from another by a distance of two feet. The wire used in the fabric has a cross-section area of 0.185 square inch. The original position of the wire fabric is maintained. There is substantially no distortion of the wire fabric during the construction period which lasts for several days; even when four and one-half inches of concrete is poured over the fabric and supports. Upon setting, the surface of the concrete shows good tensile strength and the surface does not crack.

It is apparent that many modifications of the support structures are possible without departing from the spirit and scope of the invention. Accordingly, the invention should not be limited except in the light of the appended claims.

Having described the invention, what is claimed is:

1. A support for positioning and maintaining a rigid reinforcing bar in preselected elevated position above a bearing surface for formation of a slab construction comprising a member having an upper supporting surface normally positioned in a first plane for contact with and support of said reinforcing bar, a substantially flat base normally positioned in a second plane, and a plurality of legs composed of a resilient material extending outwardly and generally radially downwardly from the supporting surface and connected to the base at point spaced radially thereabout whereby application of a downwardly directed unbalanced force upon the rigid reinforcing bar will cause the legs of the support to deform to produce downward displacement of the reinforcing bar and whereby said supporting surface and said base are positioned in substantially coplanar relationship and, upon removal of the

5

applied force, the legs will rebound to their initial conditions to return the rigid bar to its original preselected elevated position.

2. The support of claim 1 wherein the material of construction is a plastic composition of molecular weight ranging from about 50,000 and higher and the material possesses at least about ten percent crystallinity.

3. The support of claim 2 wherein the material of construction is selected from polyvinyl chloride and polypropylene.

4. The support of claim 1 wherein the reinforcing bar supporting surface is provided with a channel formed, at least in part, by a pair of surrounding lobed members which can spread about, enclose and hold the bar within the channel.

5. The support of claim 1 wherein the legs of the member are spaced apart at generally the mid portions thereof but joined one to another at the terminal ends which can rest upon the base.

6. The support of claim 1 wherein the material of construction is a plastic composition of molecular weight ranging from about 100,000 to about 200,000 and a crystallinity of from about 30 to about 70 percent.

7. The support of claim 6 wherein the material of construction is selected from polyvinyl chloride and polypropylene.

8. In combination, apparatus comprising a rigid reinforcing bar elevated, supported, and positioned relative to a bearing surface by a member having an upper supporting surface normally positioned in a first plane for contact and support of said reinforcing bar, a substantially flat base normally positioned in a second plane, and a plurality of legs composed of a resilient material extending outwardly and generally radially downwardly from the support surface and connected to the base at points spaced radially thereabout whereby application of a downwardly directed unbalanced force upon the rigid reinforcing bar will cause the legs of the support to deform to produce downward displacement of the reinforcing bar and whereby said supporting surface and said base are positioned in substantially coplanar relationship and, upon removal of the applied force, the legs will rebound to their initial conditions and return the rigid bar to its original preselected elevation.

6

9. The support of claim 8 wherein the reinforcing bar supporting surface is provided with a channel formed, at least in part, by a pair of surrounding lobed members which spread about, enclose and hold the bar within the channel.

10. The support of claim 8 wherein the legs of the member are spaced apart at generally the mid-portions thereof but joined one to another at the terminal ends which in contact with the base.

11. The support of claim 8 wherein the material of construction is a plastic composition of molecular weight ranging from about 100,000 to about 200,000 and a crystallinity of from about 30 to about 70 percent.

12. The support of claim 11 wherein the material of construction is selected from polyvinyl chloride and polypropylene.

13. The combination of claim 8 wherein the support is constructed of a plastic composition of molecular weight ranging from about 50,000 and higher and the material possesses at least about ten percent crystallinity.

14. The combination of claim 8 wherein the support is constructed of a plastic composition selected from polyvinyl chloride and polypropylene.

References Cited

UNITED STATES PATENTS

1,139,987	5/1915	Lukens	52—687
1,441,357	1/1923	Lampert	52—684
1,499,983	7/1924	Heidrich	52—689
1,841,743	1/1932	Lampert	52—688
2,407,249	9/1946	Burner et al.	52—686
3,114,221	12/1963	Eriksson	52—677
3,280,529	10/1966	Reuss	52—689
3,292,335	12/1966	Stober	52—677

FOREIGN PATENTS

518,524	2/1940	Great Britain.
1,205,184	8/1959	France.
1,244,183	9/1960	France.
805,712	5/1951	Germany.
986,450	3/1965	Great Britain.

FRANCIS K. ZUGEL, *Primary Examiner.*