

Oct. 4, 1966

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3,276,176

SYNTHETIC PLASTIC MOLDING FORM

Filed April 23, 1963

3 Sheets-Sheet 1

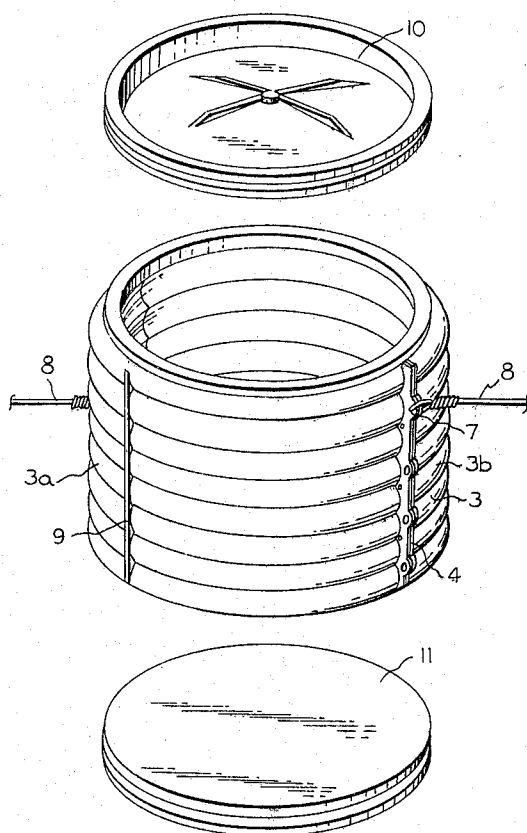


FIG. 4

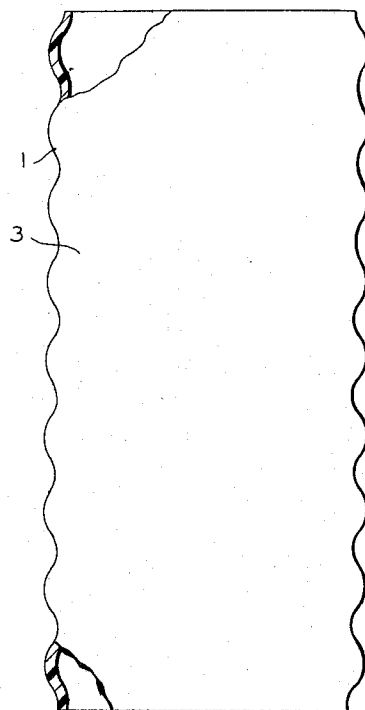


FIG. 1

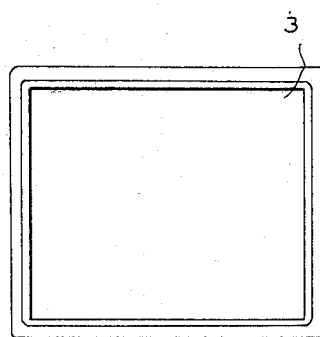


FIG. 2

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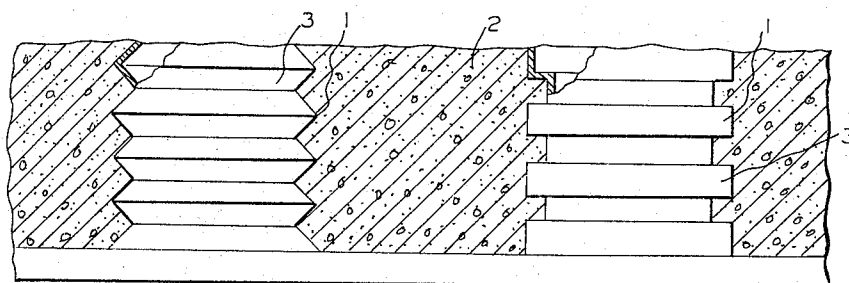


FIG. 3

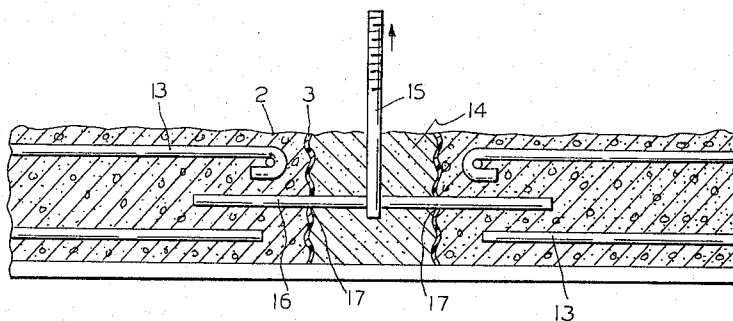


FIG. 7

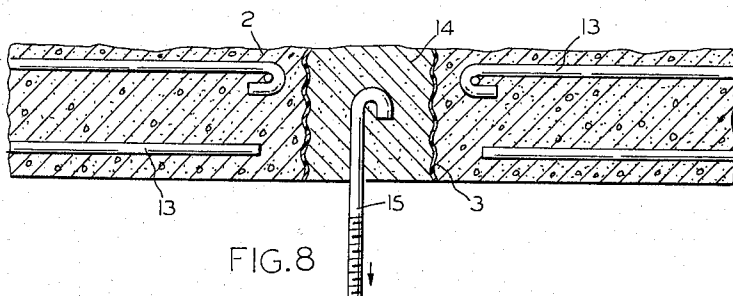


FIG. 8

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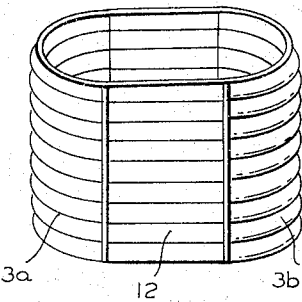


FIG. 5a

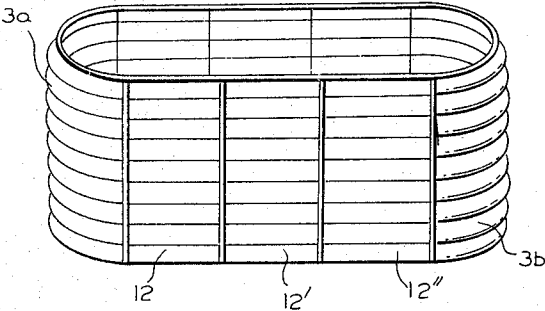


FIG. 5b

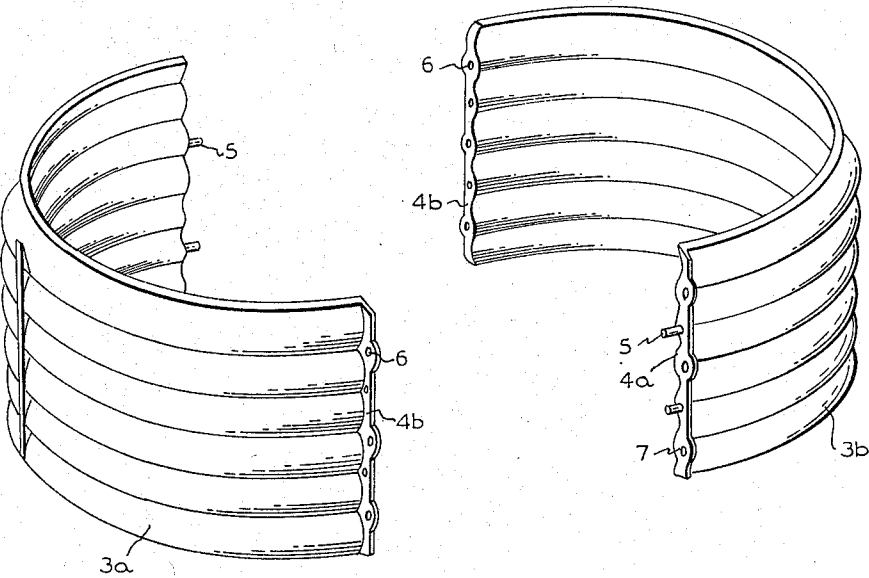


FIG. 6

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SYNTHETIC PLASTIC MOLDING FORM

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8 Claims. (Cl. 52—309)

The present invention relates generally to a building element for use within the house building technics as well as within civil engineering and similar fields. Generally speaking it could be said that the subject of this invention can be used in all connections where in a construction containing concrete or some similar mouldable material there is need of a moulding form which without any harm can be incorporated with the finished construction.

In the above-mentioned technical fields there is often a need for the creation of hollow spaces, voids or apertures for the reception of details which must, or preferably should, be mounted only upon solidification of the concrete. By way of example, reference can be made to such passages in concrete framings and walls etc. which are to be traversed by pipes, conduits, electrical cables and so on. Another typical case relates to the anchoring in the concrete construction of articles which in consequence of their own weight or due to external influence cause forces tending to pull them out from the solidified concrete mass. As an example of the last-mentioned case, reference can be made to the mounting of rails, steel beams and the like, especially in the under-surface of a concrete construction.

Prior to this invention the moulding forms necessary for the purposes above exemplified were generally made of wood, assembled at their places of installation and there matched to the actual requirements. It is often desired to re-fill with concrete that portion of the space defined by the form which remains when the pipe, the anchoring member or the like has been mounted. However, in order then to attain bonding with the original, outer concrete mass, the wooden form first has to be removed. This involves several drawbacks. Firstly, it means an additional working operation requiring comparatively long time and, secondly, the removal of such a form is not seldom difficult which in turn often leads to the adoption of such tools or methods, respectively, that adjacent portions of the concrete are damaged. Especially in the case of concrete beams, these damages may necessitate extensive and expensive repair work and, in certain cases, the damages are of such a nature that no reparation at all can be made. A third major disadvantage is that, after the wooden form has been removed, the hollow space which it has created contains remains thereof, especially in the form of wooden fibres adhering to the walls of the space. Naturally, this means that the contact, and consequently the bonding, between the two concrete masses becomes unsatisfactory. Finally, it should be pointed out that even if none of the disadvantages above enumerated would actually occur, that drawback is always present that in the finished construction the concrete mass inside the form must from a stress-resistance point of view be looked upon as a more or less separate body which, when subjected to sufficiently large external stresses, can be forced out from the surrounding concrete mass. In addition thereto, the fact that the moulding forms are made at their place of installation means that they become comparatively expensive and also that some of the employees of the builder must be delegated to carry out this work which is disadvantageous already in view of the continuously in-

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creasing demand for as short a construction time as possible.

The main object of the invention is to provide a building element which is cheap in manufacture and use, has very good strength and chemical resistance and can simply be given at least the majority of all the dimensions which such elements may assume.

A special object of the invention is, in a moulding form constituting a wall of separation between two moulded masses which are presumed to become subjected to external forces oriented in different directions, to make the form adapted to prevent said forces from severing the two moulded masses.

Generally stated, a moulding form according to this invention is characterized thereby that it consists of a synthetic material resistant against concrete, earth and the like, preferably a plastic, and constituted by a prefabricated, hollow body which is composed of one or more sections, has a varying cross-section and is intended to be permanently incorporated into a building construction through moulding against at least a portion of the one side of its walls.

Additional objects and advantages of the invention will appear from the following description of some preferred embodiments thereof when read in conjunction with the accompanying drawings, in which:

FIGURE 1 is a view in elevation, with parts broken away, showing a building element according to a first embodiment of the invention;

FIGURE 2 shows a horizontal view of the element in FIGURE 1;

FIGURE 3 illustrates a special use of building elements according to two further embodiments of the invention;

FIGURE 4 shows a building element according to a fourth embodiment of the invention;

FIGURES 5a and 5b illustrate how, in accordance with a special feature of the invention, building elements of different cross-sectional areas and shapes can be made through combination of standard sections;

FIGURE 6 is a perspective view in a larger scale than FIGURE 5 showing how the sections in FIGURE 5 can be joined to each other;

FIGURE 7 shows a building element according to FIGURE 1 or 4 installed in a concrete layer, and

FIGURE 8 shows a section in a plane perpendicular to the plane of the section in FIGURE 7.

The building element illustrated in FIGURES 1 and 2 consists of an integral tubular body 3 of rectangular cross-section and with undulatory corrugated walls. Preferably, the wall material of the element is some suitable plastic, e.g. polystyrene or some other plastic of the polymerisation type. As appears from the drawing, the wall thickness is small in relation to the cross-section of the element. This feature does inter alia involve that the element can conveniently be manufactured at substantial length and then, at the building site by the use of simple tools, e.g. a saw, easily divided into shorter pieces to meet the actual needs. Preferably, the undulations 1 are made according to a module system. On the other hand, in spite of the comparatively small wall thickness, thanks to the presence of the undulations, the element is not only rigid in itself but, in addition thereto, it can without the aid of any auxiliary supporting means withstand the very considerable forces which may arise when it is used as a moulding form, e.g. in a concrete construction. Obviously, as a rule these forces are greatest when the first moulding takes place against the outer walls of the element.

In FIGURE 3 there are shown two building elements 3 moulded into a concrete construction 2. The left hand element has corrugations 1 of triangular cross-section, while the corrugations of the right hand element are of

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rectangular profile. In other respects these two elements do principally correspond to the one shown in FIGURE 1. Generally, the sinusoidally undulated profile is preferable because the costs for making the tools necessary for the manufacture of the elements are then lower.

According to the embodiment of the invention shown in FIGURE 4, the building element 3 is of circular cross-section and made in two halves, 3a, 3b, the joints of which are located in a diametral plane. At their abutting edges each element half is provided with radially outwardly extending flanges 4, the detailed configuration of which is most clearly shown in FIGURE 6. As shown therein, these flanges have holes and pins, which can be brought into locking engagement. The pins have been designated by reference numeral 5 and the holes by numeral 6. As does also most clearly appear from FIGURE 6, the one flange 4a of each element half 3a and 3b is provided with pins only, whereas the other flange, 4b, has only holes. In addition to these holes 6, all flanges have pairwise registering holes 7 which are provided for the purpose of facilitating the fixation of the moulding form before the moulding operation. That fixation can be made by means of metal wires 8 which are inserted through the holes 7 as shown in FIGURE 4.

The element illustrated in FIGURE 4 does in two further respects deviate from the embodiments earlier described. The one difference consists in the presence of axial ridges 9. These do on the one hand serve as stiffening means for the finished moulding form and, on the other hand, they do during the manufacturing of the form promote uniform distribution of the plastic material in the matrices or similar tools, in which the form halves are made. The second difference is that the element has been provided with discs, or lids, 10 and 11 making it possible to close its ends. That possibility is of great value for several reasons. One advantage is that by means of the end discs it can be guaranteed that the interior of the element is completely protected from impurities during all working steps which precede the pouring of concrete into the interior of the form. Another advantage is that it becomes possible omnilaterally to surround the element with e.g. concrete.

FIGURE 4 does also show that discs 10 and 11 are convex outwardly. Thereby it is attained that when the discs are subjected to an external pressure, the forces generated by that pressure do only tend to press more firmly against the element proper. Suitably, the diameter of the discs is chosen in such a manner that they fit in the element when each of its end surfaces are located in a plane corresponding to the minimum diameter of the element.

FIGURE 5a illustrates how the cross-sectional area of the element can be increased through the introduction of corrugated but uncurved wall portions 12 between the two halves 3a and 3b. In the embodiment of the invention shown in FIGURE 5b no less than three such additional wall portions 12, 12' and 12'' have been inserted between the two curved element halves 3a and 3b. Sections 12, 12', 12'' do of course also have flanges 4 and fastening means in the form of holes and pins. In this context it should be emphasized that this method of joining the different sections of the element has been chosen for the purpose of illustration only and can be supplemented with or replaced by other methods, such as glueing.

In FIGURE 7 there has been shown a building element according to FIGURES 1 or 4 installed in a concrete layer 2 containing reinforcing rods 13. The interior of the element is likewise filled with a mass of concrete 14 which has been poured after hardening of the concrete in layer 2. The purpose of the construction is to make possible such a subsequent moulding of a smaller concrete body which shall retain an anchoring member 15 that is presumed to become subjected to great forces tending to pull it out of the concrete. As appears from the figure, thanks to the corrugated shape of the surface separating the two con-

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crete bodies, these forces are effectively transferred to, and thus absorbed by, the larger reinforced concrete layer 2. Before the concrete moulding takes place a so-called mounting-rod 16 is inserted through holes 17 in the walls of the element 3. The hook-like lower end of member 15 grips around rod 16 inside the form 3. In this way it is possible to hold member 15 fixed in its correct position during the moulding and hardening of the concrete.

FIGURE 8 does principally correspond to FIGURE 7 but shows a section in a plane perpendicular to the plane of section in FIGURE 7. In addition thereto the anchoring member 15 is directed downwards and the mounting rod has been omitted.

Finally, it should be underlined that the embodiments of the invention shown on the drawing and above described are only meant to illustrate the general principle thereof. A variety of different modifications can be made as far as the shape of the element proper is concerned as well as relating to the means for assembling the sections of the element and for fixing the latter in its desired position. As an example of a modification of the first-mentioned type it could be mentioned that the pitch of the corrugations need not be constant in one and the same element. While it is true that the invention makes it possible to produce building elements of relatively great length there can in certain cases still be desirable to connect two or more elements axially after each other. For that purpose any suitable means can be used, such as internal or external jointing sleeves. In the end it should be pointed out that the expression "building element" as used here shall be construed in its widest sense. To illustrate this fact it could be mentioned that an element in accordance with the present invention can be used as a moulding form for the mounting of poles for fences, traffic signs and the like.

What we claim is:

1. A molding form for use in the formation of concrete structures, comprising: a synthetic plastic tube having corrugated walls, said plastic being resistant to concrete and earth, and integrally-formed flanges, extending parallel to the axis of said tube and radially from the exterior walls of said tube, having apertures formed therein adapted to receive wires for holding said form in place during concrete formation.
2. A molding form in accordance with claim 1 wherein the tube is rectangular in cross-section.
3. A molding form in accordance with claim 1 wherein the tube is circular in cross-section.
4. A moulding form in accordance with claim 1 which includes at least one pressure-fit cap adapted to close the end of said tube and prevent the entry of concrete during a portion of the concrete formation operation.
5. A molding form in accordance with claim 1 wherein the tube includes at least two side sections mechanically coupled together to form said tube.
6. A molding form in accordance with claim 5 wherein the tube includes at least one pair of opposed, flat side panels coupled between two semi-cylindrical sections to provide a tube of oblong cross-section.
7. A molding form in accordance with claim 5 wherein each section has formed along its edges a portion of the flanges and said portions form said flange when said sections are coupled together.
8. A moulding form in accordance with claim 7 wherein one portion of the flange has second apertures which are cooperatively engageable with pins formed at complementary points on the other portion of said flange.

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