Feb. 18, 1958 E. J. MILLER ET AL 2,823,442

CARTON FORM

Filed July 9, 1953 2 Sheets-Sheet 1

Fig. 1.

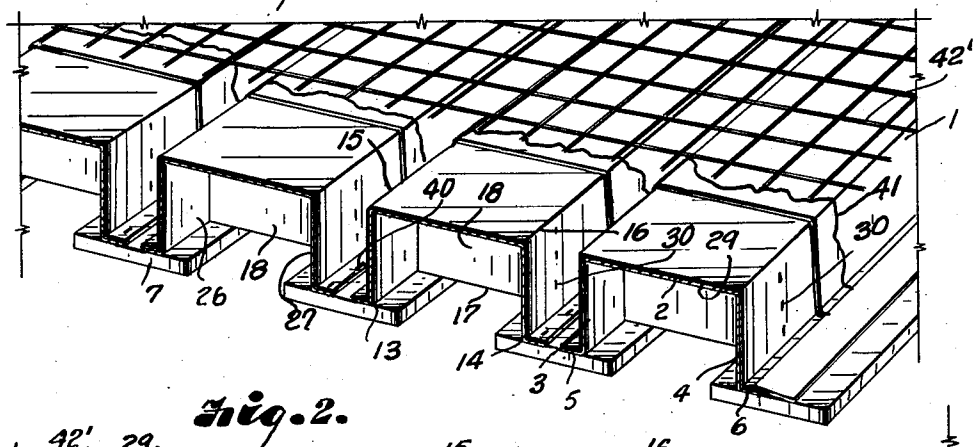


Fig. 2.

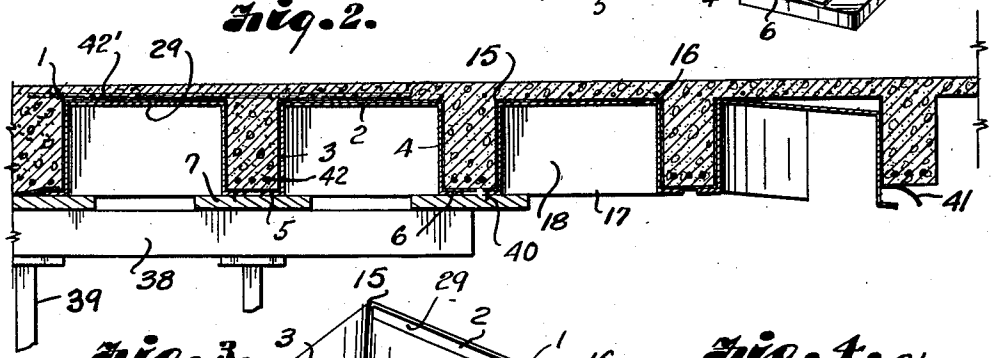


Fig. 3.

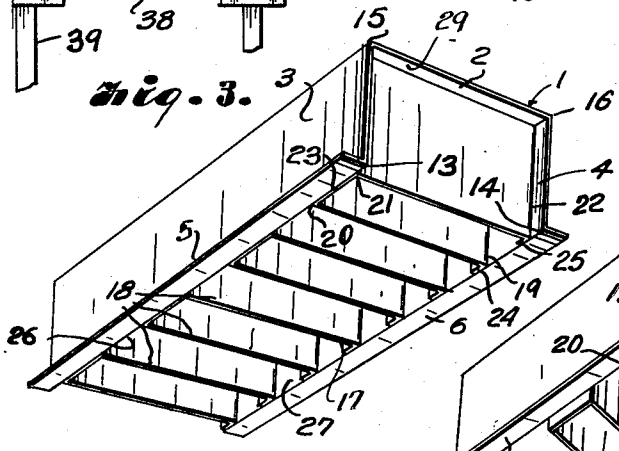


Fig. 4.

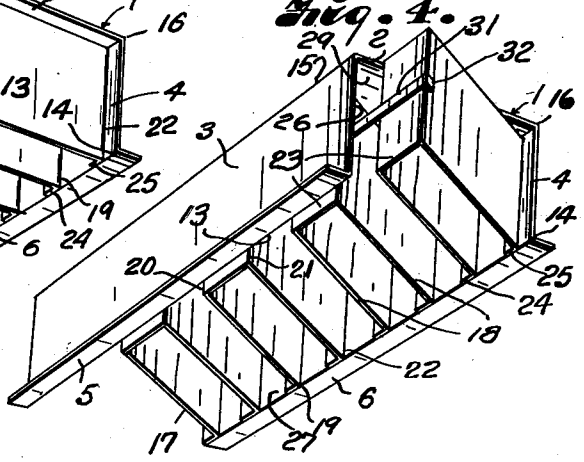
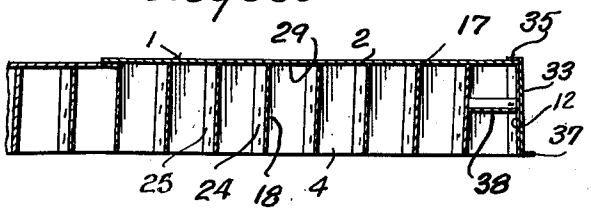


Fig. 5.



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Fig. 7.

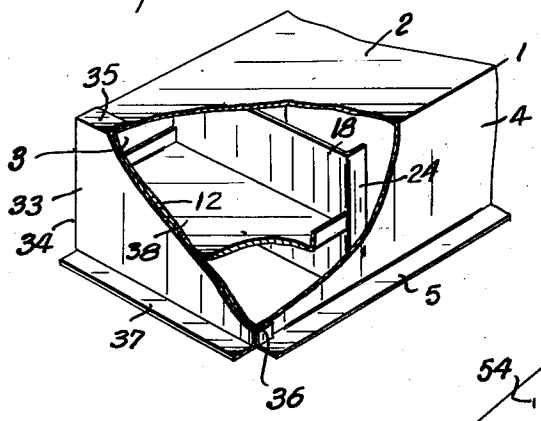


Fig. 6.

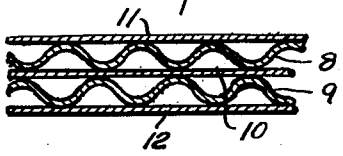


Fig. 8.

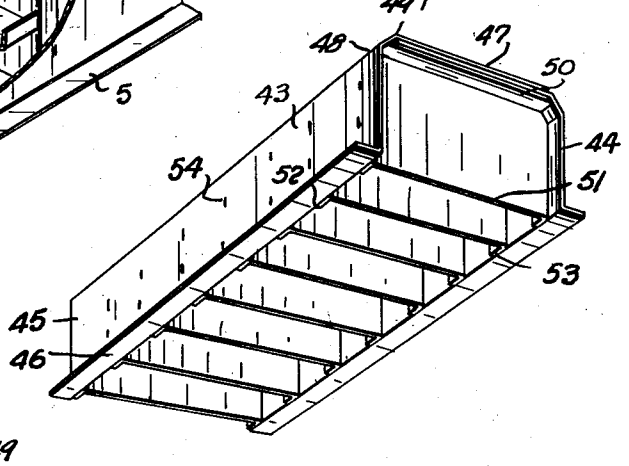


Fig. 9.

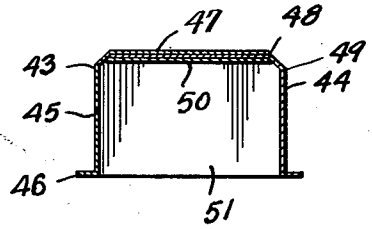


Fig. 10.

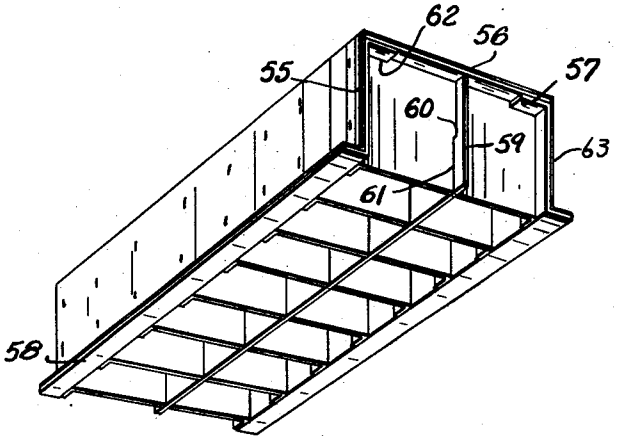
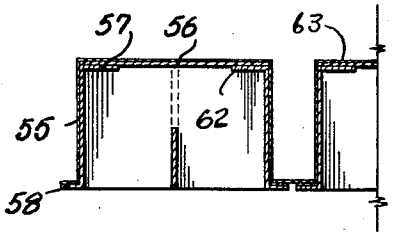


Fig. 11.



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CARTON FORM

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Application July 9, 1953, Serial No. 366,991

3 Claims. (Cl. 25—131.5)

This invention relates to forms particularly for producing recesses or voids in concrete floor and wall structures and has for its principal object to provide inexpensive form members of strong light weight construction that are readily placed and adjusted to conform to the dimensions required in any given building specification.

Another object of the invention is to provide a form adapted to be made from paper material, particularly corrugated paper or similar board to not only reduce the initial and placement costs, but to simplify placement of electrical conduits, boxes and various piping in the plumbing of a building.

Other objects of the invention are to provide forms which are so inexpensive that they need not be removed but left in place after pouring and hardening of the concrete, thereby utilizing the insulating and acoustical properties of the paper material; to provide forms having the component parts adapted to be cut and scored at the factory and shipped in flat condition for assembly at the job site; to provide a form comprising a series of standard size units that are capable of being telescoped relative to each other to provide recesses of any desired length; to provide forms which are readily cut to the desired lengths or to accommodate them to the piping electric conduits and the like; and to provide a structure that is adequately braced at the ends, sides and top to withstand placement of the reinforcement and pouring of the concrete.

It is the further object of the invention to provide a strong light weight form of paper material that is adapted to be removed for reuse when reuse of the forms is desirable.

In accomplishing these and other objects of the invention as hereinafter pointed out, we have provided improved structure, the preferred forms of which are illustrated in the accompanying drawings wherein:

Fig. 1 is a perspective view of a plurality of form units assembled to provide the voids in a concrete floor structure and which are constructed and installed in accordance with the present invention.

Fig. 2, is a cross section showing the completed concrete floor and the manner of removing the forms when reuse of the forms is desirable.

Fig. 3 is an underneath perspective view of the form illustrated in Figs. 1 and 2.

Fig. 4 is a perspective view of the form showing release of the filler or supporting section to facilitate removal of the form.

Fig. 5 is a longitudinal section through adjacent units showing the telescope arrangement to provide a void of given length.

Fig. 6 is an enlarged cross section through a preferred type of paper board from which the form is constructed.

Fig. 7 is a perspective view of the end portion of one of the endmost units, showing the construction thereof to provide a finished side for the transverse beam in a floor structure.

Fig. 8 is an underneath perspective view of a modified form of the invention.

Fig. 9 is a cross section through the forms illustrated in Fig. 8.

Fig. 10 is an underneath perspective view of a further modified form of the invention.

Fig. 11 is a cross secttion through a partial assembly of form units of the character illustrated in Fig. 9.

Referring more in detail to the drawings:

1 designates one preferred type of form constructed in accordance with the present invention and which includes a top 2 and sides 3 and 4 provided along the lower edges with outwardly turned flanges 5 and 6 that are adapted to seat on the soffit boards 7 of a shoring structure as later described. The portions of the form thus far described are constructed of a light weight sheet material, such as paper board and preferably a corrugated board since such board has substantial strength and is light in weight. When corrugated board is used, it should consist of two or more plies of corrugated sheets 8 and 9, an intermediate lining sheet 10 and facing sheets 11 and 12, all connected together by an adhesive and treated with moisture resistant materials. Solid fiber or press board having the necessary strength rigidity may also be used or it may be used in conjunction with corrugated board.

The form unit illustrated in Figs. 1 to 6 inclusive has the top 2, sides 3 and 4 and flanges 5 and 6 all formed of a single piece of corrugated board having a width corresponding to the total width of the flanges 5—6, sides 3—4, and top 2, and length corresponding to length of form. The board is provided with transverse parallel scores to provide the folds 13 and 14 on which the flanges 5 and 6 are turned outwardly from the sides 3 and 4 and folds 15 and 16 on which the sides 3 and 4 are turned and/or hinged from the plane of the top 2. In the illustrated instance the sides 3 and 4 substantially form right angles with respect to the top 2; however, the sides 3 and 4 may be splayed outwardly to provide draft for facilitating removal of the forms if required. The sides 3 and 4 and top 2 are supported in rigid position by a supporting or filler structure 17, which includes a plurality of transverse spacers 18 extending transversely between the inner faces of the side walls 3 and 4 and in spaced apart relation as best shown in Figs. 3 and 5. In the illustrated instance the spacers are constructed in pairs from a single strip of sheet board material which is also preferably a similar corrugated board having transverse scores to provide folds 19, 20, 21 and 22 on which the board is bent to provide the spacers 18, a connecting web 23 at one end, and laterally extending flanges 24 and 25 at the opposite end of the spacers so that the flanges and web are adapted to bear respectively against the inner faces 26 and 27 of the sides 3 and 4 shown in Fig. 3.

In assembling the form the spacers are inserted between the sides 3 and 4 with upper edges 28 thereof in contact with the under face 29 of the top 2 with the flanges 24—25 bearing against the inner face 26 of the side 4, and the web 23 bearing against the inner face 27 of the side wall 3, after which the flanges 24 and 25 are secured to the side walls 4 by a fastening means, such as staples 30 of the type used in securing the flaps of ordinary corrugated paper boxes. The web portions 23 of the spacers may be secured to the opposite side wall; however, to facilitate ready removal of the forms when desired, a thin flat strip 31 may be fastened to the faces of the webs extending along the face 26 of the side 3. The strips 31 has a hook 32 to engage the endmost portion of the form for securing the web connected ends of the spacers in place against side 3. Releasing the hook facilitates removal of the form as later described.

After assembly the form is preferably provided with a waterproof coating, such as paraffin or similar wax

which does not weaken the structural strength of the material and which provides the necessary lubricating surfaces to prevent adhering of the form to concrete. Such coating may be applied by dipping the forms in the melted coating material.

The forms just described may be assembled in end to end relation, preferably with the end of one form overlapping the other to provide a length in forming the length of a void. If required, one or more of the forms may be shortened by cutting off a portion thereof with an ordinary knife in obtaining an assembly of the desired length.

In order to close the ends of the forms, the endmost units are provided with caps **33** also preferably constructed of corrugated board of sufficient size to close the ends of the form. The caps are provided with lateral flanges **34**, **35** and **36** for lapping the end marginal portions of the sides and top of the endmost forms. The lower edge of each cap is provided with a footing flange **37** corresponding with the flanges **5** and **6** of the side walls of the form. The caps **33** are preferably backed by the endmost spacer **12** and a transverse brace strip also of corrugated board **38** is inserted between the two endmost spacers as shown in Fig. 5 to further support and strengthen the cap members **33**. The flanges **34**, **35** and **36** of the cap are preferably secured to the top and at least one of the side walls to assure retention on the cap members.

Forms of standard size may be completely constructed at the factory and shipped to the job site, however the present construction is especially adapted to the cutting and scoring of the corrugated board at the factory with the parts shipped in flat condition to the job site so as to provide a material saving in shipping costs over the completed forms. The simplicity of construction of the forms and connection of the parts permit assembly of the forms to the job site with a minimum of skilled labor which further reduces the cost. The parts forming the body of the forms are bent on the score lines to provide the flanges **5** and **6**, sides **3** and **4** and top **2** of the form, after which the strips or parts which form the filler **17** are bent on the transverse scores to provide the spacers **18**, flanges **24—25** and web **23** after which the spacers **18** are placed within the form and the flanges secured thereto by staples **30** applied by conventional hand operated stapling device. The supporting frame work for the forms which include the soffit boards **7** is assembled with the soffit boards **7** spaced in proper relation and supported on transverse stringers **38** that are carried on shoring **39**.

When the specifications require plastering of the underside of the finished floor, metal lath may be placed directly over the soffits after which the forms are assembled in their proper relationship with the flanges bearing on the lath and secured at suitable intervals by fastening devices such as nails or staples **40** so that the forms are prevented from shifting on the soffit boards. Electrical conduits, boxes or piping for plumbing may be positioned prior to assembling of the forms, and the various conduits or pipes may be extended directly across the soffits to their terminals without bends such as are required when placing such piping or conduits around conventional metal or wood forms.

The forms constructed in accordance with the present invention may then be applied in their desired position on the soffit boards. When a form must be applied over a pipe or conduit the form may be readily fitted thereon by cutting the paper opening through the wall of the form with an ordinary knife. The opening may be such that the form closely fits about the pipe and the inherent stiffness and rigidity of the material provides a seal sufficient to prevent leakage of concrete around the pipe.

Voids of desired length are provided by assembling a required number of formed units in end to end relation

with the end of one unit telescoping the end of the adjacent unit. Then if the combined length of the units is greater than the desired length of the recess, one or the other of the endmost units may be cut off by a knife and the end cap fitted thereon. However, it may be simpler to employ the completed end units and to make the adjustment by cutting off portions of one or more of the intermediate units.

After placement of the forms, strips of paper **41** may be placed over the top and sides of the units to extend across the soffits. The reinforcing rods, such as designated **42**, may then be supported between the forms as is the present practice after which the floor or other reinforcing **42'** is applied and supported by the tops of the forms as shown in Fig. 1.

When the forms are thus constructed and assembled they are of ample strength to withstand application of the various reinforcements and the pouring of the concrete. During setting of the concrete the forms maintain their shape without any expansion or contraction, which would ordinarily set up stress in the concrete; consequently, when the concrete is set it is free of such stresses and the voids are accurately formed in accordance with the desired specifications. When ceiling hangers or the like are required they may be readily thrust through the material of the form and supported by the reinforcement. After setting of the concrete, the shoring stringers and soffit boards may be removed. However, the forms may be left in place so as to obtain benefit of the acoustic and insulating properties of the material from which the forms are made. If desired the forms may be readily removed after removal of the supporting structure by shifting the spacers as shown in Fig. 4, thereby freeing the forms and giving substantial room to release the opposite sides of the forms. The forms can then be reassembled and used in constructing an upper floor. While it may be necessary to destroy all or portions of those forms which have been fitted about the various piping or ducts, the forms are so inexpensive that they may be replaced with new forms on the upper floor, and yet provide a substantial saving over present day conventional type forms.

In the form of the invention shown in Figs. 8 and 9 the body of the form is constructed of two sections **43** and **44** and with each section providing a side **45**, flange **46** and a top **47**. The tops **47** of one section overlap the corresponding top portion of the other section as best shown in Fig. 9. In this form the corners may be provided with parallel scores so that the bends **48** and **49** provide angular connections between the sides **45** and top portions **47** to provide fillers in the finished concrete structure. The top of the form may be further reinforced by placement of a rigid board **50** under the innermost of the lapping top portions **47** and which is supported upon upper edges of the filler strips or spacers **51**. In this instance the fillers consist of single strips of corrugated board having flanged ends **52** and **53** that are secured to the sides of the forms by fasteners such as staples **54**.

In the form of the invention shown in Figs. 10 and 11 the sides **55** and top **56** are made of separate parts. In this instance the sides **55** include corrugated boards having upper and lower longitudinal flanges **57** and **58** with the upper flanges **57** forming the support for the top member **56**. The filler or supporting members conform with those illustrated in Fig. 8; however, in this instance they are connected longitudinally by a strip of corrugated board **59** having slots **60** extending inwardly from the upper edge thereof to cooperate with corresponding slots **61** extending upwardly from the lower edges of the spacers to provide interlock connections therebetween when the parts are assembled as shown in Fig. 10. In this instance the upper corners of the spacers are provided with notches **62** to accommodate the inturned flanges **57** of the side members of the form.

In modified forms illustrated in Figs. 10 and 11 may be used in telescoping relation as in the first described form of the invention and the endmost forms provided with end caps as the installations may require. The units, as shown in Figs. 10 and 11 may be enclosed in a lighter weight material as indicated at **63** which extends across the top and down the sides of the form and over footing flanges.

From the foregoing it is obvious that we have provided an inexpensive strong light weight form that is readily placed and adjusted to conform with dimensions of the required recesses. It is also obvious that the forms may be readily fitted about the usual piping conduits, boxes and the like necessary in a building structure. It is also obvious that the forms illustrated may be readily removed after use and reused in forming an upper floor or even another building structure.

What we claim and desire to secure from Letters Patent:

1. A form of corrugated board adapted for bearing support on spaced apart soffits to shape and support poured concrete into spaced apart longitudinal beams and a floor, said form including a member having two opposite side walls, a top connecting upper edges of the side walls, and footing flanges extending outwardly along lower edges of the side walls, said side walls, top and footing flanges all being provided of corrugated board having longitudinal parallel folds integrally connecting the footing flanges with the side walls and the side walls with the top, and transverse members also formed of corrugated board having a depth corresponding with height of the side walls and having folds spaced apart according to spacing between said side walls to provide lateral flanges at ends of said transverse members, said transverse members being located between the side walls in spaced apart relation with the flanges at the ends thereof in face contact with inner faces of the side walls and with their upper edges in direct supporting contact with said top and their lower edges substantially in plane with flanges of said side walls to prevent the top and side walls from buckling inwardly under weight of the concrete, the flanges at one end of the transverse members being fastened to one side wall and the other ends of any two transverse members being connected by a flange and unattached to the other side wall, whereby the transverse members are carried by said one side wall and are connected in pairs to hinge on said folds thereof when the form is to be removed after use.

2. A form as described in claim 1, wherein the endmost transverse member at one end of the form is spaced inwardly from said one end of the form to provide for lapping said one end of the form over an end of an adjacent form when a plurality of forms are needed in forming the length of said beams.

3. A form as described in claim 1, wherein the endmost transverse member at one end of the form is spaced inwardly from said one end and said one end is closed by a cap having lateral flanges adapted to lap margins of said one end of the form, and a brace member, also of corrugated board, extending between the cap member and said endmost transverse member and having ends connected with said side walls.

References Cited in the file of this patent

UNITED STATES PATENTS

1,205,242	Middendorf et al.	Nov. 21, 1916
1,258,923	Marqua et al.	Mar. 12, 1918
1,507,046	Cockerell et al.	Sept. 2, 1924
1,600,396	Campbell et al.	Sept. 21, 1926
1,619,269	Read et al.	Mar. 1, 1927
1,626,823	Hedberg	May 3, 1927
1,770,701	Kelly	July 15, 1930
1,892,311	MacDonald	Dec. 27, 1932
2,101,019	Bowes	Dec. 7, 1937
2,180,964	Rogow	Nov. 21, 1939
2,657,726	Silverman	Nov. 3, 1953