

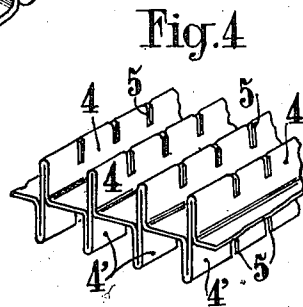
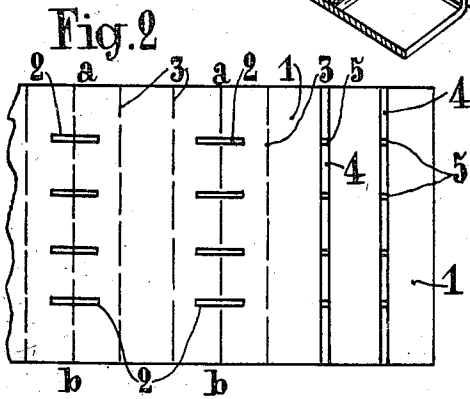
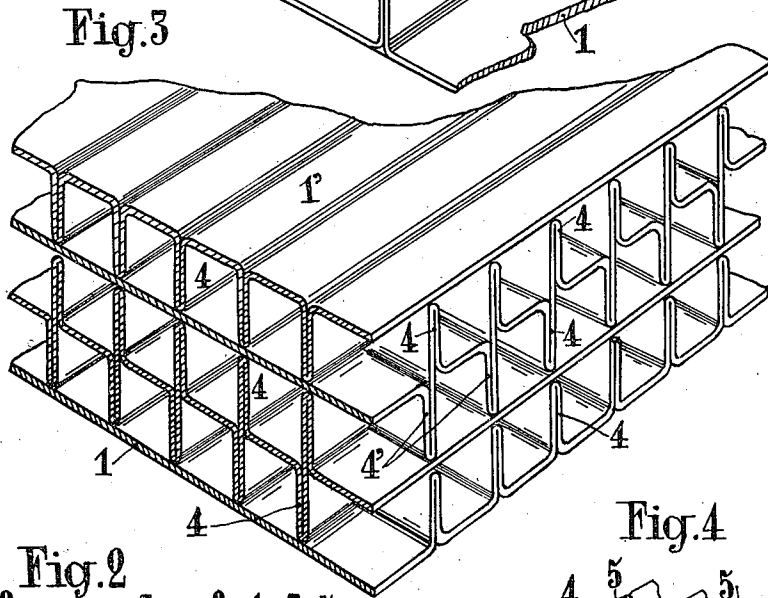
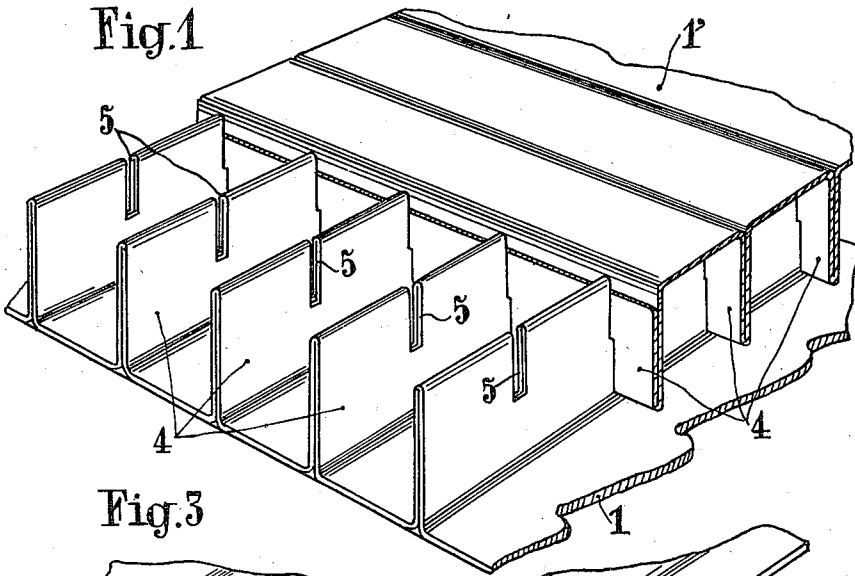
April 2, 1935.

H. W. ROMANOFF

1,996,490

CELLULAR STRUCTURE FOR PANELS AND OTHER APPLICATIONS

Filed June 30, 1933



INVENTOR:
Hippolyte W. Romanoff
BY *Lucas P. ...*
ATTORNEY

UNITED STATES PATENT OFFICE

1,996,490

CELLULAR STRUCTURE FOR PANELS AND OTHER APPLICATIONS

Hippolyte Waldemar Romanoff, Paris, France,
assignor to Wladimir Senutovitch and Emil
Nobel, both of Paris, France

Application June 30, 1933, Serial No. 678,495
In France July 2, 1932

5 Claims. (Cl. 189—34)

This invention relates to cellular structures and consists in a method whereby such structures may be realized. According to the invention this may be done by folding a sheet of material in such a manner as to form an element carrying a series of partitions having a double thickness, preferably parallel to each other and perpendicular to the general plane of said sheet.

The invention further consists in assembling these elements with a second, similar element, the partitions of which are however arranged at right angles in respect to the prior elements; this connection between the elements being effected by inserting into one another the partitions thereof, to this end, with notches or slits of corresponding depth.

In a modified form of the invention, a plurality of intermediate elements are used, carrying partitions extending in an opposite direction with respect to the central plane of the structure and, according to the thickness required, one or several of such elements are assembled with simple, external elements of the type described hereinbefore, the connection being effected by means of slits formed in these partitions, as shown in the first case.

It will be understood that the invention relates to all cellular structures, obtained by the method according to the invention, and intended to be used in any possible application.

With above and other objects in view, the invention consists in the novel construction and arrangement of parts fully set forth and claimed in the following specification and illustrated in the appended drawing.

Figure 1 is a perspective view of a cellular structure according to the invention having a layer of cells, part of the upper wall being shown removed.

Fig. 2 is a view on a smaller scale of a sheet of material perforated and ready for folding.

Fig. 3 is a perspective view also on a smaller scale of a cellular structure according to the invention having several layers of cells, and

Fig. 4 is a perspective view on a still smaller scale of a single middle component of the structure shown in Fig. 3.

To build, for instance, an element such as used in the device shown in Figure 1, it is necessary to proceed from a sheet 1 represented in plan on the left hand side of Figure 2 and formed with slits 2 and, if desired, with markings or tracing lines 3. The sheet is then folded along the lines $a-b$ taken across the central part of said slits 2, such folding resulting in a series of partition walls 4 (refer to Figure 1 and to right hand side of Figure 2)

made up by two contiguous sheets, the partitions being arranged in parallel relation to each other and being separated by an interval corresponding to the space included between two markings or tracing lines such as 3. Said partition walls carry, on the upper half of their top, a notch 5 formed by folding above mentioned slits 2.

On element 1 thus formed, another similar element 1' is arranged the walls 4 of which are set up at right angles in respect to those of the first element, the elements being assembled by insertion into one another of notches 5.

Figure 3 shows a perspective view of a modified structure carrying three ranges of superimposed hollow cells. In this embodiment of the invention, the external elements 1-1' are similar to those of the structure illustrated in Figure 2. These elements are assembled with two intermediate special elements each carrying, as clearly shown in Figure 4, a plurality of ranges of double partitions 4-4' extending in an opposite direction. These various partitions are formed with notches 5 and are assembled at right angles, as previously explained. This arrangement is clearly shown in Figure 3.

It is clear that in practice the sheets whereof the elements described are formed will be automatically perforated and folded by means of a machine; likewise, such elements may equally be mechanically assembled, with or without an adhesive substance and whatever be their dimensions and the use they are intended for.

It will of course be understood that the invention is not limited to the exact embodiment shown and may receive any structural modifications desired without departing from the scope of the invention.

Any material capable of being folded may be utilized, for instance: paper, cardboard, aluminium, copper, zinc, lead, etc., according to the use the structure is intended for.

The finished structure is extremely solid and offers a high resistance to compression in every direction. The cost of automatic manufacture is so low as to be neglected and as the materials used possess a commercial value which may be practically considered as constant, it is comparatively easy to calculate the cost price of such structures for any given quantities and dimensions.

The structures made of paper may be utilized as an insulating means against heat and sound. With respect to non-conductivity of heat, a paper structure is equivalent to cork, but is lighter and more resisting, its specific weight being of 0.14,

whereas that of cork is 0.24. The paper may be impregnated with a non-burning substance. Owing to its isolating properties, the structure may be used as a covering or lining for refrigerators, frigorific wagons, houses, ships, etc. and in all such applications an appreciable increase in resistance will be noted.

The structure may be covered on its faces with sheets of plates in wood or other material, fixed by adhesive or otherwise, and be substituted for the wooden panels in the manufacture of furniture, partitions and other applications.

When the structure according to the invention is intended for use in light constructions or for manufacturing interior walls or partitions, it may be made watertight and impregnated with a non-burning substance. The structure may be covered with plaster, paper, or wooden plates or be decorated in any desired manner.

When made of cardboard, the structure may be used in light bridge construction and when constituted by thin metal sheets, it may serve in the construction of aeroplanes and other flying machines, thus eliminating entirely the usual framings and timberworks.

Finally, the structure may be of steel or iron and be used for various kinds of constructions: houses, bridges, rail-road sleepers, beams, etc.; more particularly, it is thus possible to realize any complicated constructions and eliminate entirely or partly the usual riveting or bolting.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:

1. A cellular structure comprising a plurality of integral members of sheet material each having a series of parallel channels with double-walled sides and bases lying in the same plane, the sides of the channels of one such integral member intersecting the sides of another such integral member at right angles and being interlocked therewith by means of slots in said sides.

2. A cellular structure with one layer of cells,

comprising a pair of integral members of sheet material each having a series of parallel channels with double-walled sides extending from one face of the sheet and bases lying in the same plane, the sides of the channels of one such integral member intersecting with the sides of another such integral member at right angles and being interlocked therewith by means of slots in said sides.

3. A cellular structure with several layers of cells, comprising a plurality of integral members of sheet material each having a series of parallel channels with double-walled sides extending from both faces of the sheet and bases lying in the same plane, a pair of integral face members of sheet material each having a series of parallel channels with double-walled sides extending from one face of the sheet and bases lying in the same plane, said pair of integral face members being disposed with the first-mentioned members occupying interior and the second-mentioned members occupying exterior positions and with the sides of the channels of each integral member intersecting the sides of another integral member at right angles and being interlocked therewith by means of slots in said sides.

4. A cellular structure comprising a pair of sheet-like facing members, each having a plurality of parallel ribs extending from one face thereof, and at least one sheet-like intermediate member having a plurality of parallel ribs extending from both faces thereof, said facing members being assembled with the intermediate member with the ribs of the facing members intersecting the ribs of the intermediate member, all of said ribs having cooperating notches provided therein to permit the ribs of one member to abut the sheet-like portion of an adjacent member.

5. A structure as defined in claim 4, in which the ribs of all members are of double thickness and in which each member, including its ribs, is formed of an integral piece of material.

HIPPOLYTE WALDEMAR ROMANOFF.