Jan. 4, 1927. 1,613,152

C. A. AGAR

SHIPPING CONTAINER

Filed May 12, 1925 2 Sheets-Sheet 1

FIG. 1

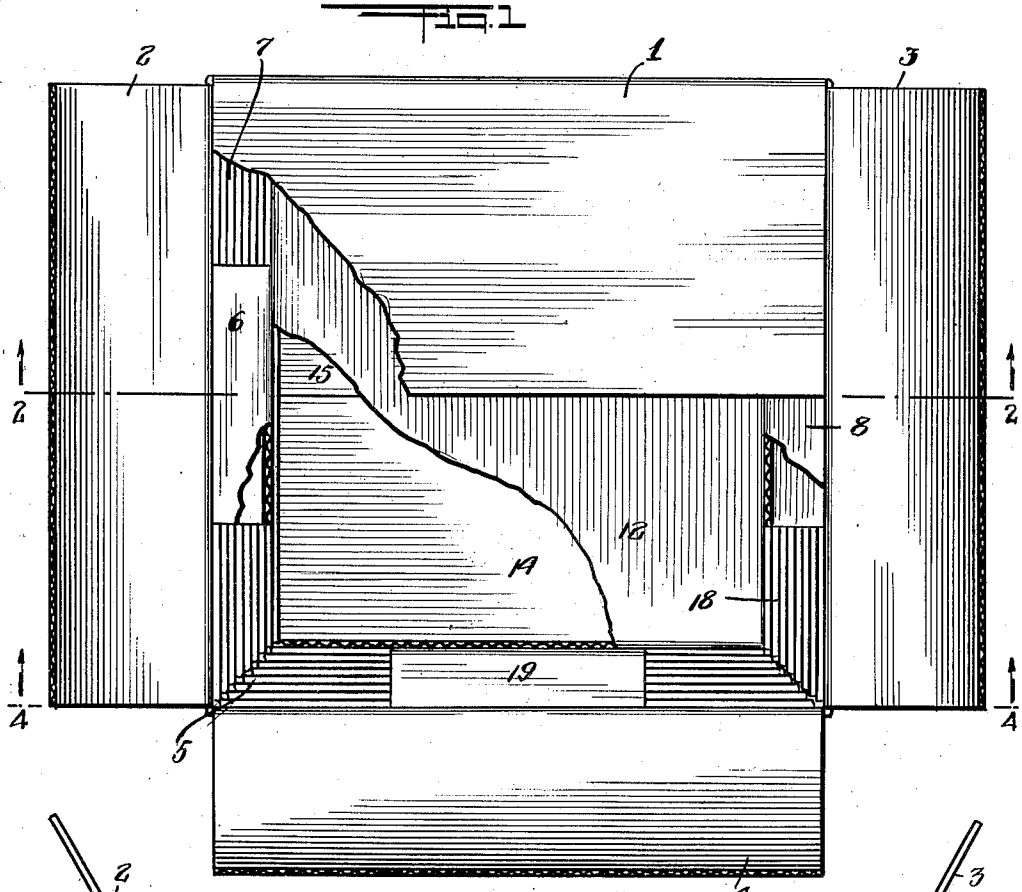
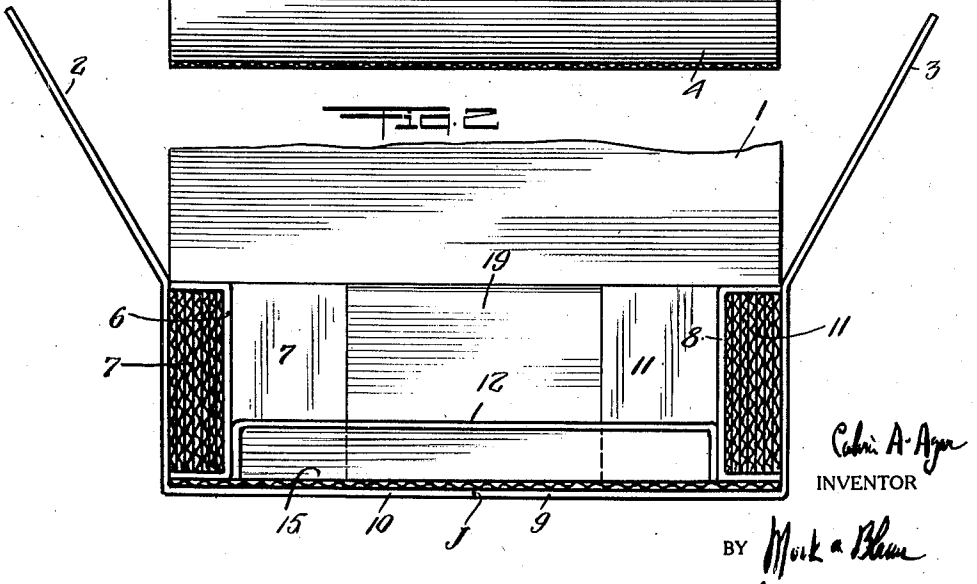


FIG. 2



Calvin A. Agar
INVENTOR

BY Mark & Blum
ATTORNEYS

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Fig. 3

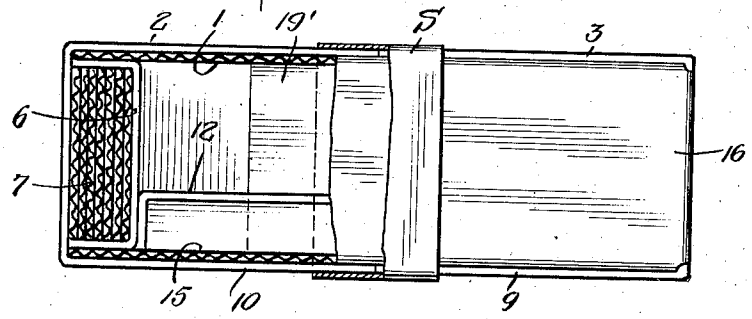


Fig. 4

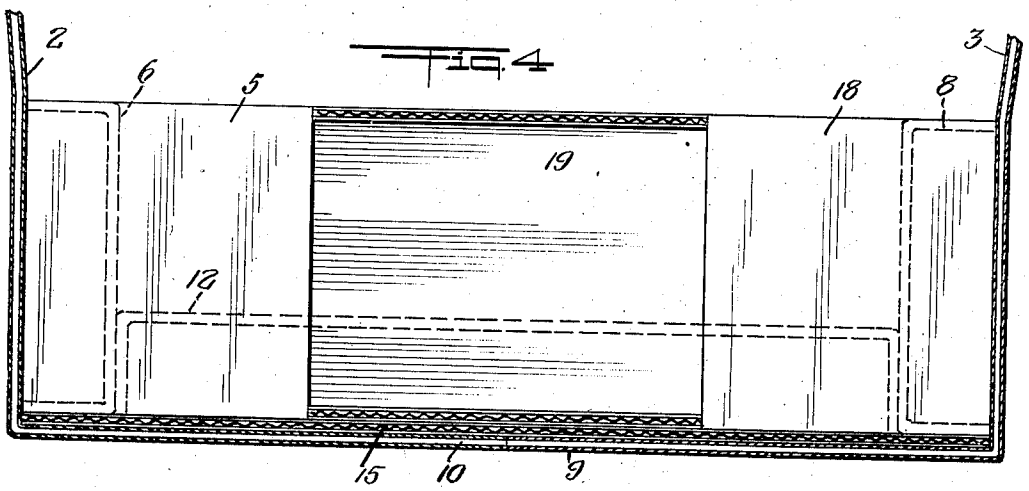


Fig. 5

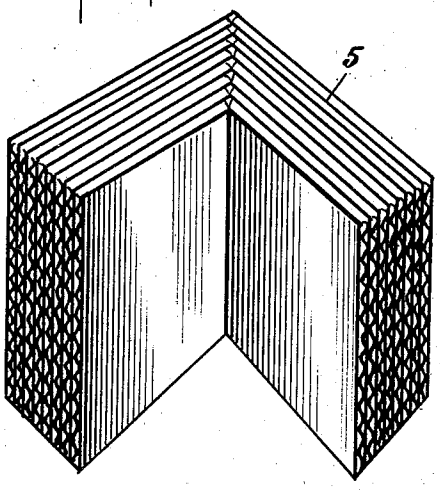
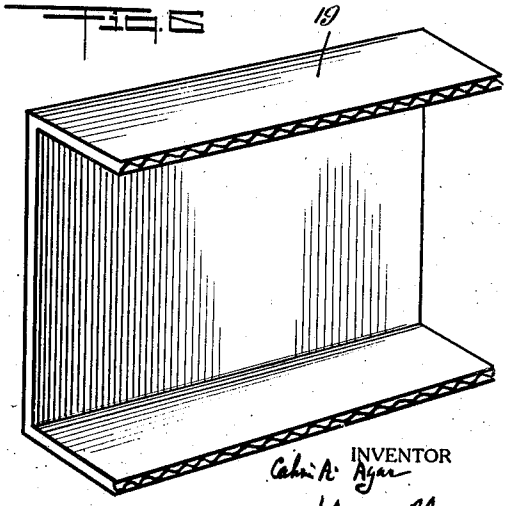


Fig. 6



Calvin A. Agar INVENTOR

BY Mack & Blum

ATTORNEYS

Patented Jan. 4, 1927. 1,613,152

UNITED STATES PATENT OFFICE.

CALVIN A. AGAR, OF WEST ORANGE, NEW JERSEY.

SHIPPING CONTAINER.

Application filed May 12, 1925. Serial No. 29,686.

My invention relates to a new and improved shipping container or box.

One of the objects of my invention is to provide a box which will combine maximum strength and lightness.

Another object of my invention is to devise a box which will have maximum reinforcement at the points at which the box is subjected to greatest stress.

Another object of my invention is to provide a box having a reinforcement of special type for the corners thereof, as these are the points at which I have found the box is subjected to the greatest stresses.

Another object of my invention is to provide a box having a number of members made of corrugated paper, these members being so disposed that the said corrugated paper provides the maximum strength.

Another object of my invention is to provide a shipping container or box which will be especially adapted for shipping radio sets and other objects which can be readily injured or broken by the shocks incident to shipping.

Other objects of my invention will be set forth in the following description and drawings which illustrate a preferred embodiment of my invention, it being understood that the above general statement of the objects of my invention is intended to generally explain the same and not to limit it in any particular.

Fig. 1 is a top view of the box, three of the cover flaps being shown in the partially open position, and one of the cover flaps being shown in the closed position, certain parts of some of the interior members of the box being broken away so as to more clearly illustrate the construction thereof.

Fig. 2 is a section on the line 2—2 of Fig. 1.

Fig. 3 is a front view of the box in the closed position, some of the parts being broken away to provide clearer illustration.

Fig. 4 is a section on the line 4—4 of Fig. 1.

Fig. 5 is a perspective view of one of the corner reinforcements.

Fig. 6 is a perspective view of one of the side spacing members.

The body of the box is made of a single layer of corrugated cardboard. As shown, for example, in Fig. 6, a sheet of corrugated cardboard is composed of two sheets of heavy paper glued or otherwise suitably fastened to an intermediate sheet of corrugated paper so that a strong resilient structure is formed. Cardboard of this type in and of of itself has been well known for many years. A single large sheet of corrugated cardboard of this type may be considered as divided into four panels, each said panel comprising three members, the central member constituting a vertical wall of the box, another member constituting a bottom member of the box and a third member constituting a cover or flap member of the box. These panels are bendable along what may be termed "horizontal" lines, that is, lines which are parallel to the bottom of the completed box.

The bottom and cover flap members of adjacent panels are separated by vertical cuts and the cardboard is scored at the respective junctions of the respective wall members of adjacent panels so that the sheet of cardboard can be bent into box form and the outer ends of the wall members of the said sheet of cardboard can be connected by means of a strip of cloth or the like in the ordinary and well known manner.

If the wall 16 illustrated in Fig. 3 be considered as the front wall of the box, then as can be seen in Fig. 1, the box is provided with a front closure flap 4, a rear closure flap 1 and end closure flaps 2 and 3.

When the said flaps are in the closed position, the front and rear flaps 4 and 1 are the lower flaps, and the end flaps 2 and 3 are the upper flaps and it is clear that the lines of corrugation in the end flaps 2 and 3 are perpendicular to the lines of corrugation in the front and rear flaps 4 and 1. Similarly, and as shown in Fig. 4, for example, the front and rear bottom flaps or members 14 and 15 are the inner bottom flaps of the box and they remain unconnected to each other, and the bottom end flaps 9 and 10 are connected to each other at their junction line J by a strip of any suitable material which may be glued to the said bottom flaps 9 and 10. When the box is closed the end top flaps 2 and 3 may also be connected by a strip S of suitable material.

While I have arbitrarily designated the wall 16 as the front wall of the box, any of the walls of the box may be considered as the front wall thereof and it is also immaterial which portion of the box is considered as the bottom portion and which is consid-

ered the top portion, because of the uniformity of construction of the various parts of the box before specified. It is also obvious that the corrugations of the inner bottom flaps 14 and 15 are perpendicular to the corrugations of the outer bottom flaps 9 and 10.

Experience has shown that a box of this general construction does not have sufficient strength and resiliency to be used for the purpose of shipping radio sets or similar delicate articles, and experience has shown that as high as 15% of the radio receiving sets now shipped are broken in transit.

Hence, I provide the box with an inner base 12 which can be placed upon the bottom of the box, and be spaced from the vertical walls of the box. This inner base 12 is preferably made of a sheet of corrugated paper having four vertical flaps which rest upon the bottom flaps of the box.

In order to enable the article which is being shipped to be firmly held upon this inner base 12, and spaced from the vertical walls of the box, four side spacing members 6, 8, 19 and 19' are provided. The general construction of one of these side spacing members 19 is shown in Fig. 6, from which it can be seen that this consists of a sheet of corrugated cardboard having two horizontal flaps so that the lines of corrugation in the vertical portion of each said side spacing member are parallel to the lines of corrugation in the adjacent wall member. The lines of corrugation in the spacing flaps of each said side spacing member are, of course, perpendicular to the lines of corrugation in the adjacent wall member.

Corner spacing members 5, 7, 18 and 11 are provided and these constitute a particularly important feature of my invention.

As shown in Fig. 5, each corner member is angular and consists of a plurality of sheets of corrugated cardboard of uniformly varying length, each said sheet being scored along the median line thereof, the said sheets being glued or otherwise secured to each other so as to form a continuous angular member having planar ends.

It will be noted that the lines of corrugation in the said corner spacing members are horizontal, that is, they are perpendicular to the lines of corrugation in the wall members. While I have specified the relative positions of the lines of corrugation in the various members, when it is assumed that the box is being held in a certain position, this is merely to enable the various parts to be conveniently described as, of course, the operation of my device is not dependent upon any particular position thereof.

The tops of the side and corner spacing members are substantially at the same level as the tops of the end walls of the box so that by means of the construction herein specified the radio set or other article which is being shipped rests upon a resilient cardboard base spaced from the bottom of the box and it fits tightly within a side frame composed of the four corner spacing members and the four side spacing members.

Careful testing has shown that shipping boxes or containers are weakest at their corners and by means of the before mentioned construction a particularly durable and efficient reinforcement is provided at the corners of the box, with a minimum of cost, because the box itself can be manufactured in the well known manner and the inner spacing members can be separately manufactured and assembled with a minimum of time and effort.

Experience has shown that it is not necessary to provide a spacing member which will space the radio set or other object which is being shipped from the top flaps of the box because the base 12 provides sufficient resiliency to protect the article being shipped from what may be termed vertical shocks.

I prefer to so dimension the various spacing members, including the inner base 12, so that the radio set or other article which is being shipped fits tightly into the enclosure provided therefor when the box is closed, and this is facilitated by the fact that the side spacing members are not rigid but have bendable spacing flaps and because the corner spacing members have a fixed shape but are so resilient that they can yield to a certain extent at the corners thereof. That is, the two legs or branches of each said corner member can be moved so as to slightly increase or decrease the right angle between them as shown in Fig. 5. However, the corner spacing members have greater rigidity and strength than the side spacing members so that the jars incident to shipping are mainly taken up at the corner members. I prefer that the spacing members should not have the structure shown in Fig. 5 throughout their entire length, because this would make them too heavy and rigid. By combining corner spacing members such as shown in Fig. 5, with intermediate side spacing members such as shown in Fig. 6, a light but resistant structure is produced.

In order to provide the necessary degree of resiliency and reinforcement in such corner members, I have found it advantageous to make them of not less than eight (8) layers of cardboard. As shown in Fig. 5, each said corner member only has a single layer or sheet of corrugated cardboard intermediate two layers or sheets of smooth board, so that a maximum amount of smooth board and a minimum amount of corrugated board is provided in each said corner member. As shown in Figs. 1 and 5, the scored ends of each sheet of corrugated paper are bent away from each other.

Practical tests and experience has shown that a container made as before specified is of superior lightness and durability.

In making the corner spacing members, I prefer that the layers of corrugated board should not extend to the corner or angle line of the said member. Hence the corner portions of the uncorrugated layers of paper remain unconnected to the adjacent layers of paper so that each said corner spacing member is resilient and bendable to a certain extent about the angle line thereof.

I prefer to first shape each layer of paper of which the corner members are composed, into its final shape and to then assemble the said layers by gluing them to each other to produce the construction previously specified.

While I have shown the various parts as being made of corrugated cardboard, I do not wish to restrict my invention so as to exclude the use of any form of what may be termed cellular paper or board, namely paper, cardboard or the like which is not made of a solid sheet of material, but in which the material is so formed as to possess internal resilience.

I have shown a preferred embodiment of my invention, but it is clear that numerous changes and omissions could be made without departing from its spirit.

I claim:—

1. An angular spacing member for a shipping container comprising more than three contacting bent sheets of continuously corrugated and of uncorrugated paper connected to each other to form a unitary resilient structure having a predetermined normal shape, the said sheets being bent and the sheets of corrugated paper being directly scored so as to have corresponding angle lines, the lines of corrugation of the corrugated paper being substantially perpendicular to said angle lines.

2. An angular spacing member for a shipping container comprising more than three contacting bent alternate sheets of continuously corrugated paper and of uncorrugated paper connected to each other to form a unitary resilient structure having a predetermined normal shape, the said sheets being bent and the sheets of corrugated paper being directly scored so as to have corresponding angle lines, the lines of corrugation of the corrugated paper being substantially perpendicular to said angle lines.

3. An angular corner spacing member for a shipping container comprising more than three contacting bent sheets of corrugated and of uncorrugated paper, said sheets being connected to each other to form a unitary resilient structure having a predetermined normal shape, the said smooth sheets being bent and the sheets of corrugated paper being directly scored so as to have corresponding angle lines, the scored edges of said corrugated sheets being bent away from each other, the lines of corrugation of the corrugated paper being substantially perpendicular to said angle lines.

In testimony whereof I affix my signature.

CALVIN A. AGAR.