Jan. 8, 1935. M. P. CHAPLIN 1,987,525

FRAGILE ARTICLE SUPPORT

Filed Oct. 24, 1934 3 Sheets-Sheet 1

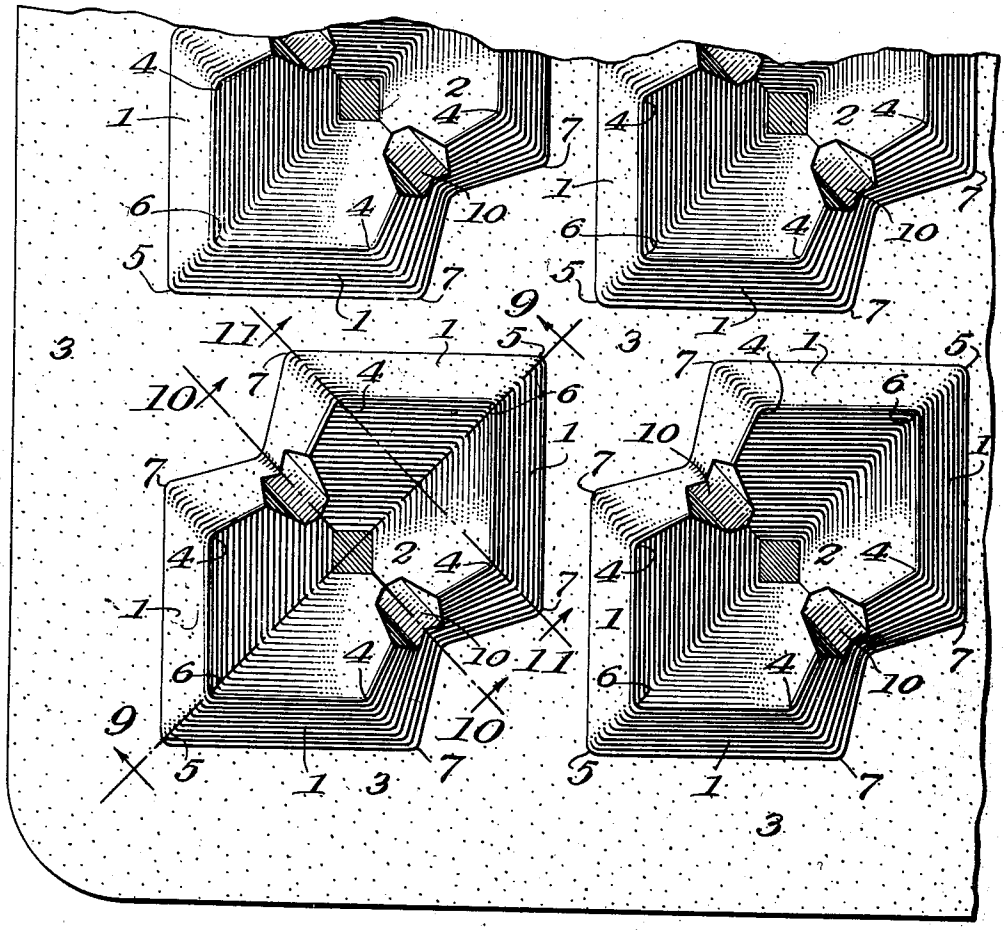


Fig. 1

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Filed Oct. 24, 1934 3 Sheets-Sheet 2

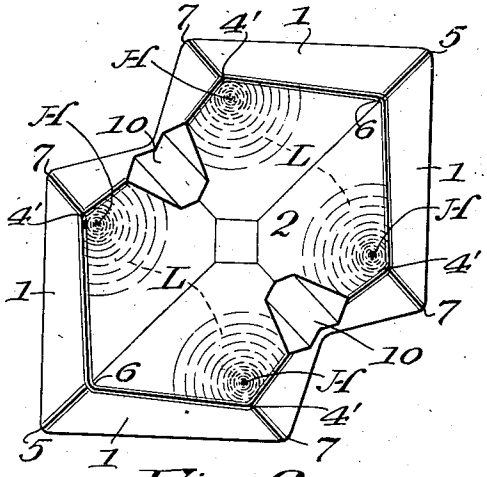


Fig. 2

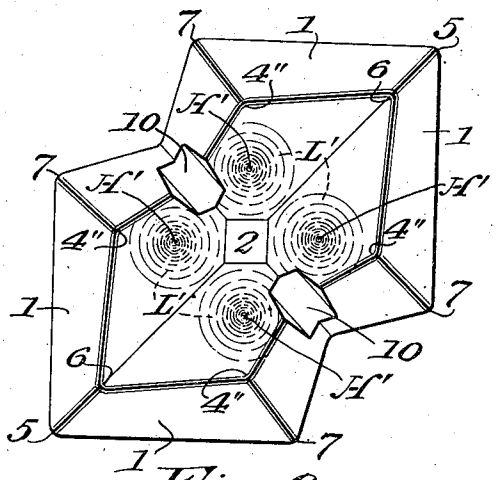


Fig. 3

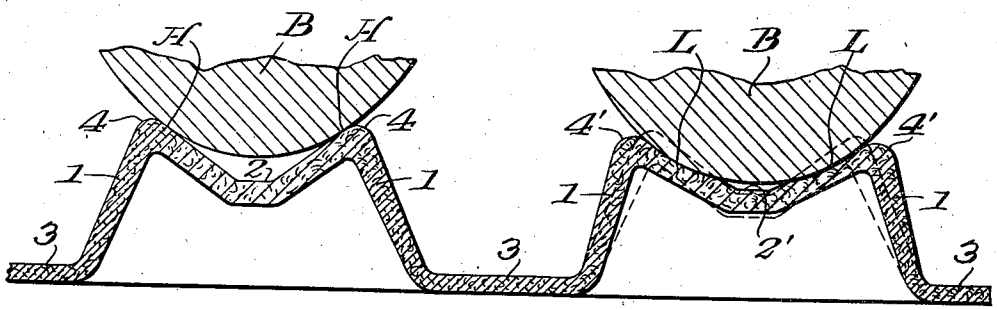


Fig. 4

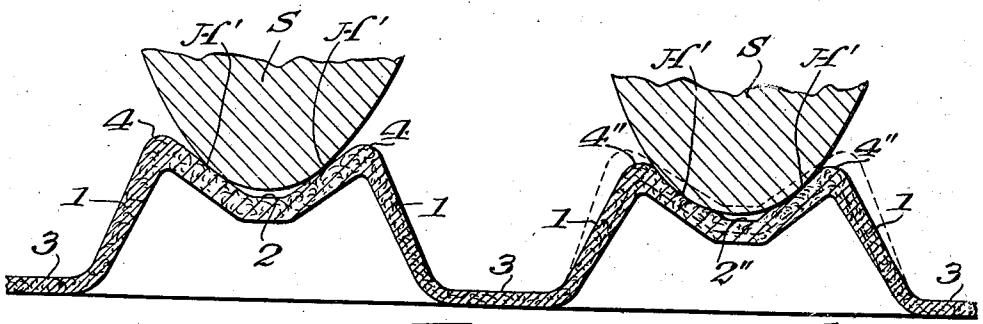


Fig. 5

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FRAGILE ARTICLE SUPPORT

Filed Oct. 24, 1934 3 Sheets-Sheet 3

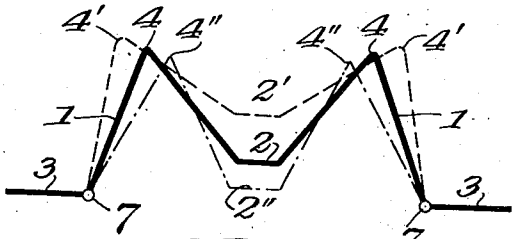


Fig. 6

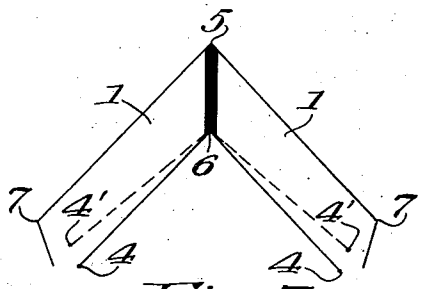


Fig. 7

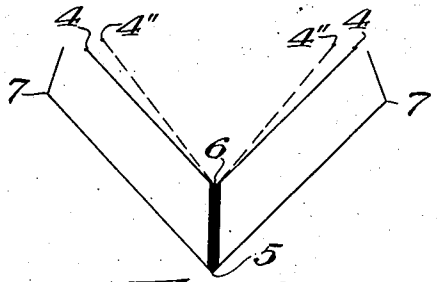


Fig. 8

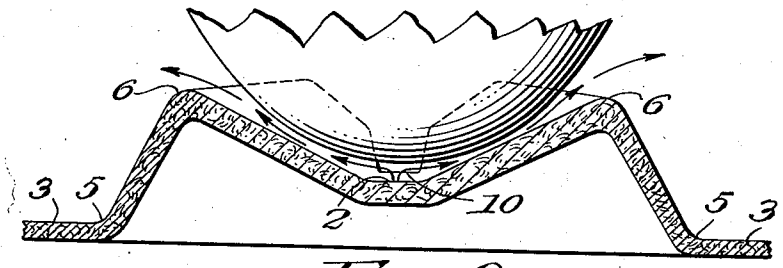


Fig. 9

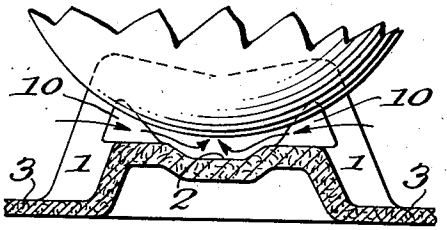


Fig. 10

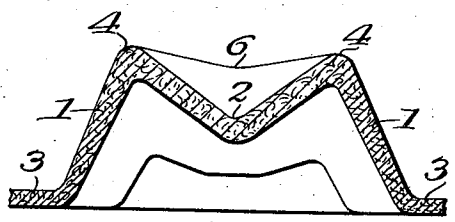


Fig. 11

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UNITED STATES PATENT OFFICE

1,987,525

FRAGILE ARTICLE SUPPORT

Merle P. Chaplin, Waterville, Maine, assignor, by mesne assignments, to The Canal National Bank of Portland, Trustee, Portland, Maine

Application October 24, 1934, Serial No. 749,849

12 Claims. (Cl. 217—27)

In supporting fragile objects so that they may be safely handled and transported, it is necessary that the supporting area of contact be sufficient to distribute the weight of the object over a considerable area and avoid undue pressure at any particular point or undue pressure over any small area, and also it may be desirable to have a free circulation of air over practically the entire surface of the object. Also it is frequently necessary to avoid any considerable area of contact or any surface exposure to any dead air pocket.

Where uniform and standard size objects are to be supported, the supporting member can be shaped to fit certain portions of those objects and afford the necessary area of contact. However, where it is necessary or desirable to use a structure for supporting objects of various sizes and shapes or conditions of disposability, it is necessary that such structures be self-adapting or accommodating to these varying sizes and shapes in order adequately to perform the function conceived of.

My present invention relates more especially to a member for supporting objects in this latter variant or like class, being particularly designed for the supporting of eggs and similar ovate objects which vary considerably in size, proportion or displacement.

It is to be understood, however, that my present discussion is purely for purposes of illustration, and that my invention is in no way limited exclusively to the packing of eggs, but that its principles apply equally to the packing of various other objects, kindred in the art.

In order that the many advantages, which my supporting structures afford when used for the supporting of eggs and like objects, may be fully understood and may be made fully applicable, it will be helpful at this point to refer briefly to methods and structures now commonly employed in the packing of eggs and the problems peculiar to that industry.

For example, one current commercial method of packing eggs is to place them layer on layer in cases or crates of standard size, each layer of eggs being supported by a sheet commercially known as an "egg filler". In such, each egg in each layer is separated from the other eggs in said layer by vertical partition strips of paper or cardboard commonly known as "egg case fillers".

Egg flats previously suggested in the art or in the use vary considerably in their construction and in the materials of which they are made. Mainly, they usually consist of a sheet of material on which are fabricated or impressed, cushions, rings, cups or other similar conformations or members on or in which the bottom or pointed end of the egg rests.

Many of the earlier designs of egg flats disclosed simply a cushion member on which the pointed end of the egg rested. Some of the later designs provide a cup, usually made large enough to afford space for the smaller end of a large egg.

These cups are usually made annular or ring-like in shape with a depressed central portion for receiving the end of an egg. Due to the ring-like structure enclosing the rim of the cup, such cups are not readily capable of enlargement or adjustment to receive extra-large eggs without unduly stretching the material of the fabric itself.

Inasmuch as the material of the flats must be sufficiently strong and resistant to withstand the weight and pressures of the egg some of the earlier patents indicate the desirability or necessity of incorporating some other strengthening material, such as Portland cement, in order to increase the hardness and strength of the flats, and thus enable them to sustain the loads imposed on them.

When such flats are so made sufficiently hard to withstand the loads which they must carry, the cup or ring-like members are also hard and rigid as to defeat their own proper purpose, which according to my concept is to provide an adequate cushion and support for any egg imposed thereon.

This insures a proper and adequate cushion or support for the egg or other object, and hence I am able to provide for the two most important elements required in a structure of this kind, viz, strength and rigidity where they are needed, and softness or flexibility where it is needed.

Thus my structure offers the most ideal condition for adequately supporting the object to be protected, viz, a soft, yielding cradle or sling in which the object is seated, and the necessary strength at the points of support where it is most needed in order to prevent collapse or failure of the structure to adequately carry the weight load imposed on it.

In the storage of packaged eggs it has been found to be highly important that there should be ventilation about each individual egg. In most instances in the prior art the eggs have been so compactly compressed between their layers that there was little chance for air to move around the impounded eggs, particularly at the point or end of the egg which rested on the egg flat.

According to my invention each egg pocket is

provided with vents by which a reasonable circulation of air is made possible so that there are no dead air spaces at the bottom end which might prove deleterious to the egg held within such a pocket.

In the accompanying drawings I have illustrated a selected embodiment of my invention which I have found highly satisfactory under actual service conditions and well adapted to the requirements of commercial manufacture.

In such drawings:—

Fig. 1 is a plan view showing the characteristic design of a typical portion of my structure.

Fig. 2 is a plan view of a single support and illustrates the change in the shape of the support which takes place when a large object or an object with a large end is placed therein.

Fig. 3 is a plan view of a single support and illustrates the change in the shape of the support which takes place when a small object or an object with a small pointed end is placed therein.

Fig. 4 is a sectional view through the support showing the change in shape which results from placing an object having a large end on the support. The left hand view of Fig. 4 shows the large ended object B just making contact with the support and the right hand view of Fig. 4 shows the change in support shape after the weight of the object has been transferred to it.

Fig. 5 is a sectional view through the support showing the change in shape which results from placing an object having a small or pointed end on the support. The left hand view of Fig. 5 shows the small ended object S just making contact with the support and the right hand view of Fig. 5 shows the change in support shape after the weight of the object has been transferred to it.

Fig. 6 illustrates diagrammatically the change in shape of a cross-section through the support when large and small objects are placed therein, as will be described more in detail later herein.

Figs. 7 and 8 are fragmentary diagrammatic plan views illustrative of the same.

Figs. 9 and 10 are cross-sections through the support on approximately the lines 9—9 and 10—10, respectively, of Fig. 1, the passage of ventilating currents of air under and around the eggs or other objects therein being graphically indicated by the arrows, and

Fig. 11 is a section on the line 11—11, of Fig. 1.

My support consists in the main of a structural contouring which as here shown is diamond-shaped in appearance (see Fig. 1) but which may be otherwise shaped accordingly as the contours of the object to be packed may vary.

This structure includes a fabricated sheet 3 with a plurality of upstanding side walls 1 and a central section 2 enclosed thereby. The side walls 1, as well as the sections 3 between the several supports may be compact, dense, and strong as may be required for the objects to be packed in them.

Sectional views shown in Figs. 4, 5, 9, 10 and 11 indicate by the degree of shading those portions of the entire structure which are dense, compact and strong, indicated at 1 and 3 which portions are more heavily shaded. The more lightly shaded portions as shown at 2 indicate those parts particularly the support or cradle which is soft and yielding and on which the egg or other object rests.

The included central section or area 2, thus indicated by the more lightly shaded area is made soft and yielding, and is in effect an uncompacted, flexible cradle, "slung like a hammock", between the strong and compact side walls or sustaining elements 1 of the structure, the strong sustaining elements 1 and the cradle member 2 being connected or fabricated together at the top ridge of the elements 1 along the line 4—6—4.

Referring to Figs. 6, 7 and 8, wherein the effect of placing oversize and undersize objects in this support is diagrammatically illustrated, the heavy full lines in Fig. 6 show the normal position of the sustaining elements 1 and the soft cradle member 2.

It will be observed that the supports fabricated in the sheet of wet laid fibre are not really diamond-shaped but consist essentially of two opposed oppositely angled structural formations. In these the wall members 1 and 2 are at an angle to each other and the combined wall members of each pair constituting the elements of the angle formation being considered, is disposed at an angle to the other, whereby they intersect as on a line 5—6. Here they are so fabricated together that their union constitutes in effect a more or less vertical hinge, although also inclined to the perpendicular to the main sheet 3.

Furthermore, it will be noted that these walls are interrupted by the notches 10. It will therefore be seen that opposite to their hinge line 5—6 their end portions 4—7 are spaced apart independent of each other save through the softer connection of the interior walls 2. They have therefore a certain freedom to recede from or approach each other and in such a motion their outer end as on the line 4—7 has a hinging action or flexation along the line 5—7, but reaching its maximum at the point 7 as indicated in Fig. 6. This line of flexation or hinging is in a plane at right angles to the plane which bisects the angle of intersection of the walls as they meet on the line 5—6.

When a large object is placed in the cradle, the connecting points 4 are moved outwardly to the broken line position indicated at 4' (Figs. 6, 7 and 8). This allows greater room between the points 4 for the reception of the large object, at the same time raising the cradle bottom to the broken line position indicated at 2' whereby effectively to bring the inclined surfaces of the cradle to meet the bottom of the large object and form an adequate area of support therefor.

Similarly, when a small or pointed end object is placed in the cradle, the points 4 will be moved inwardly as to the dot and dash line position indicated at 4'', and the cradle will be moved downwardly to the dot and dash line position as indicated at 2''.

Fig. 2 shows in a plan view what actually happens when a large egg or object having a large end is placed in the support. In comparing this view with the view in Fig. 1 it should be noted that the points 4 have been moved outwardly or away from each other as shown at 4' Fig. 2 and that the ventilating notch or slot 10 has yawned and so increased its width. The large object first contacted the support at points indicated at H and outward movement of point 4 together with the softness and flexibility of the inclined areas of the central section of the support 2 has increased the area of contact between the object and support as indicated by the circular shaded lines centering at H.

Fig. 3 shows in a manner similar to the treatment in Fig. 2, what actually happens when a small egg or an object having a small end is placed

in the support. It will be noted in comparing Fig. 3 with Fig. 1 that the points 4 of Fig. 1 have been moved inwardly or towards each other as shown at 4'', Fig. 3. The ventilating slots or notches 10 are slightly collapsed or decreased in width as shown. The object imposed first contacts the support at points H' and the inward movement of point 4 to the location 4' together with the flexibility and softness of the supporting member or cradle 2 increases the area of contact between the support and the object as shown by the circular shaded lines centering at point H'.

Comparing Figs. 2 and 3 illustrating the mechanical change in the shape of the supporting cradle and its structural supporting members when objects of widely varying sizes are supported properly, it will be noted that the large object first contacts the support or cradle near the outer edge while the small object first contacts the cradle or support nearer the center. The increase in area of contact is obtained by the movement of the point 4 inwardly or outwardly and the softness or flexibility of the inclined surfaces depending on the shape or character of the article to be supported.

I have already described the changes in the support which occur when large and small objects are inserted therein and which is shown in Figs. 4 and 5. It will be noted in Fig. 4 that when a large object B is inserted in the support the point 4 moves outwardly and point 2 moves upwardly. There is shown in the right hand view of Fig. 4 by the dotted lines the position which the support originally had before the large object was inserted. And it will be readily seen the changes which take place in the shape of the support under these conditions.

Similarly, in Fig. 5 when a small object S is inserted the support changes its shape but, however, in the opposite direction and manner as occurred when a large object was inserted as in Fig. 4. The points 4 when the small object is inserted move inward and the point 2 moves downward. This is illustrated in the right hand view of Fig. 5 where the dotted lines show the original position of the support before the small object is inserted therein.

Reference is made to Figs. 6, 7 and 8. These views illustrate diagrammatically the relative motions of the various parts of the structure and support which is already described and shown in the sectional views of Figs. 4 and 5.

Fig. 6 illustrates diagrammatically the movement of the points 4 and the change in shape of the cradle 2 when the points 4 are moved either inwardly or outwardly. When moved outwardly the points 4 are shown by dotted lines to have moved to point 4' and the lowermost point of the cradle from point 2 to point 2'. This motion is similarly illustrated in the right hand view of Fig. 4.

Also in Fig. 6 when points 4 are moved inwardly to points 4'', the lowermost section of the cradle is moved upwardly from point 2 to point 2''. This is also similarly illustrated in the right hand sectional view of Fig. 5.

Figs. 7 and 8 show diagrammatically a plan or top view of the support and are comparable with Figs. 2 and 3 respectively. The point 4 or one of the ends of the line of connection 4—6—4 between the supporting structure and the cradle moves inwardly and outwardly fulcrumed around two points. One of these points is the point where the upstanding section 1 is connected at its bottom at point 7 and the other fulcrum point is the top of the connecting points between the two points 6 Fig. 1. Referring to Figs. 7 and 8 the points 4 move inwardly and outwardly about the point 6 like the covers of a book. They also move about the points 6—7 inwardly or outwardly like the hinge of a door. This dual combination motion of point 4 results in an increase in the distance between the points of support of the cradle 2 as illustrated in Fig. 2 and Fig. 7 or a decrease in the distance between the points of cradle support as shown in Fig. 3 and Fig. 8.

The slot or notch 10, Figs. 1, 2 and 3, serves a dual purpose. First, to provide means for introducing air directly beneath the points or bottom-most position of the egg or other article, and second, to provide a flexible or yielding section between the points 4 which are on opposite sides of this notch so that when the points 4 move outwardly as shown in Fig. 2, the notch or slot opens up and when these points 4 move inwardly as shown in Fig. 3, these notches automatically grow narrower.

Reference has been made to the notches 10 as providing circulation of air beneath the object supported in the cradle. These notches being located on each side of the support at its lowest point at all times provide a passage below the supported article as indicated at Fig. 10. The center section of the cradle along line 6—6, Figs. 2 and 3 and shown more clearly at 2 in Fig. 11 is also below and out of contact with the supported article. This provides for ready and complete circulation of air by entering through the notches at point 10 as shown in Fig. 10 passing through under the object and out under the object as shown in Fig. 9. Under certain conditions the motion of air may be reversed but in any event complete means of air circulation is provided.

The egg or other article being supported at the four points H Figs. 2 and 3, the area of support being developed by the article itself due to its weight acting on the softness and yieldability of the cradle automatically not only provides for a satisfactory and adequate area of support, but also provides for the maximum of air circulating means around all parts of the egg.

It will therefore be seen that according to my invention there is provided a safe and snug basis of supporting the eggs for handling and in transit, and also for a pack uniformly vented throughout to guard against the development of molds or like growths that are so common where eggs are held in storage for long periods and exposed to dead air. The structure shown may be varied within the limits of the concept as disclosed but the specific type has proven advantageous in manufacture in packing, shipping or storing.

What I therefore claim and desire to secure by Letters Patent is:—

1. A support for a fragile object, comprising two oppositely disposed pairs of side walls, the walls of each pair flexibly connected with each other at one end, and the opposite ends of each pair free for outward and inward movements, and a cradle suspended between said side walls.

2. A support for a fragile object, comprising two oppositely disposed pairs of side walls, each pair flexibly connected with each other at one end, a flexible connection between the other ends of said walls for outward and inward movements of said other ends, and a cradle suspended between said side walls for raising and lowering movements accordingly as said side walls are moved outwardly or inwardly by the insertion of a large or a small object into said cradle.

3. A support for a fragile object, comprising a base, two oppositely disposed pairs of side walls extending upwardly from and flexibly connected to said base, a flexible connection at one end of each pair of walls, and a flexible connection between the other ends of said walls for outward or inward movements of said walls, and a cradle suspended between said side walls for raising or lowering movements accordingly as said side walls are moved outwardly or inwardly by the insertion of a large or a small object into said cradle.

4. A support for a fragile object, comprising structural formations including inclined supporting side walls formed as oppositely disposed V-members and a cradle suspended between the side walls and having its own wall surfaces inwardly inclined to a common center of maximum depression, the side walls and cradle having transverse notch like air vents intermediate of the two V-members and laterally entrant of the maximum cradle depression whereby air currents may have access to the included portion of an egg imposed on the cradle walls and prevent dead air pocketing of the egg shell at butt or point.

5. A support for a fragile object, comprising a base, side walls extending from said base and defining an included cradle, and a cradle suspended from said side walls, said side walls being hard and strong and said cradle being softer and more yielding than said side walls.

6. Supporting means for a plurality of fragile objects comprising a sheet of fibre having a plurality of pairs of structural angled formations fabricated within the sheet itself and each including a pair of relatively flat side walls inclined to the perpendicular and to each other and disposed in intersecting relation to each other and connected at one end at their line of intersection, the walls of each pair having their opposite ends interrupted by an intervening notch venting the cradle interior laterally.

7. A support for a fragile object, comprising a base, side walls extending from and flexibly connected to said base for adjusting movements in outward or inward directions with reference thereto, and a cradle suspended between said side walls for movements in upward or downward direction with reference to said base accordingly as said side walls are moved outwardly or inwardly by the insertion of a large or a small object into said cradle, said side walls being hard and strong and said cradle being softer and more yielding than said side walls.

8. A support for a fragile object, comprising a base, two related pairs of side walls extending from and flexibly connected to said base, the side walls of each pair being flexibly connected with each other at one end and the opposite ends of each pair free for outward and inward movements, and a cradle suspended from the upper ends of said related pairs of side walls.

9. A support for a fragile object comprising side walls and a cradle suspended therefrom, the side walls being relatively hard and strong and the cradle relatively soft and more yielding than said side walls, said cradle affording a plurality of spaced areas of contact to an object inserted therein, said side walls movable outwardly to accommodate a large object and movable inwardly to accommodate a smaller object, the outward movement of the side walls being accompanied by a raising movement of the cradle and the inward movement of the side walls being accompanied by a lowering movement of the cradle.

10. A support for a fragile object comprising a base, side walls extending upwardly from and flexibly connected to said base and to each other at one end, and the upper portion of the opposite ends of said side walls free for outward and inward movements, and a cradle suspended from said side walls, said cradle affording a plurality of spaced areas of contact to an object inserted therein, and said side walls moving outwardly and the cradle moving upwardly to accommodate a large object, and the side walls moving inwardly and the cradle moving downwardly to accommodate a smaller object.

11. A support as claimed in claim 10 wherein the side walls are relatively hard and strong and the cradle is relatively softer and more yielding.

12. Supporting means for a plurality of fragile objects, comprising a sheet having distributed over one face thereof spaced rows of individual pocket formations, each pocket formation inclusive of side walls flexibly connected with said sheet, and a cradle suspended from said side walls, said side walls being hard and strong and said cradle being softer and more yielding than said side walls.

MERLE P. CHAPLIN.