

G. M. MacDONALD.  
 ARTIFICIAL HONEYCOMB AND THE ART OF MAKING THE SAME.  
 APPLICATION FILED OCT. 23, 1919.

1,360,426.

Patented Nov. 30, 1920.

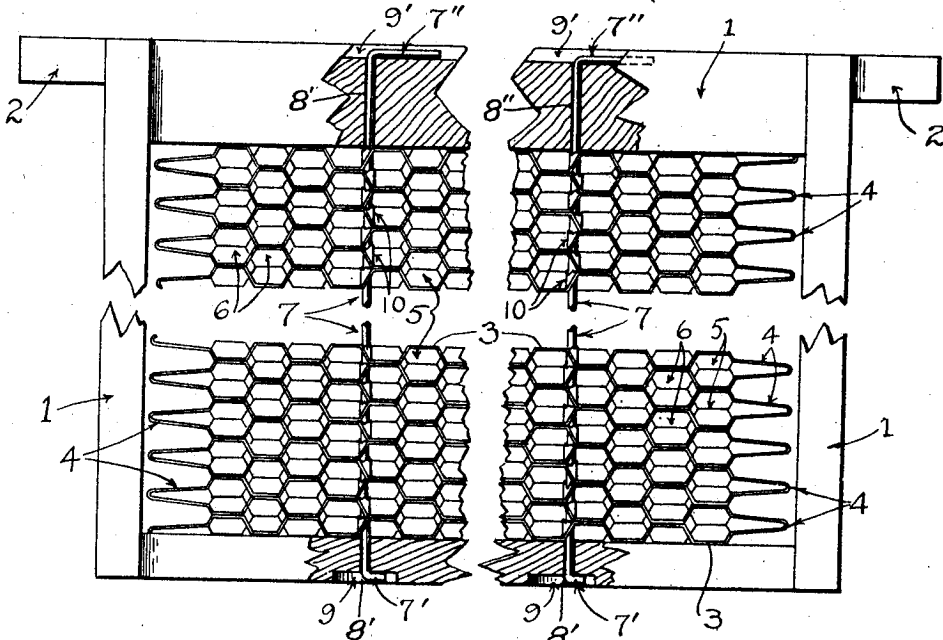


FIG. 1.

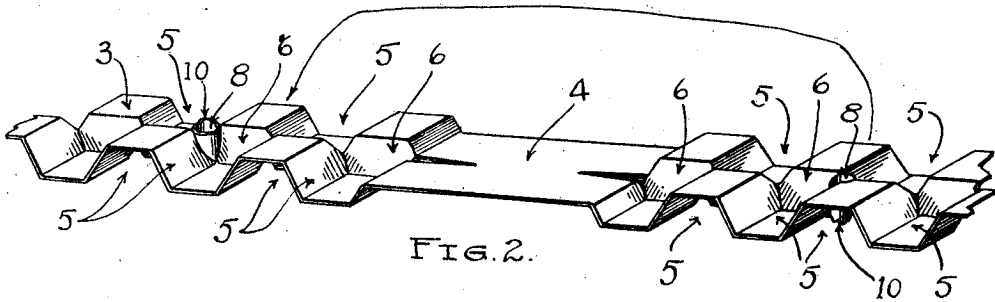


FIG. 2.

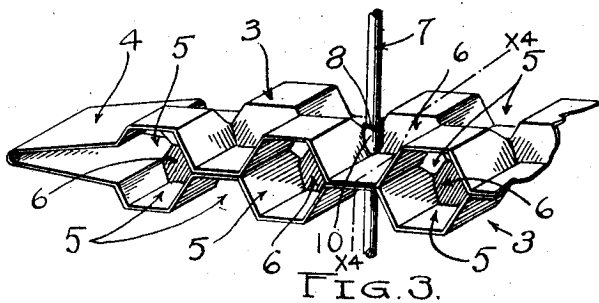


FIG. 3.

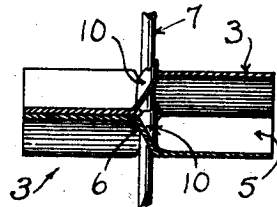


FIG. 4.

WITNESSES  
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# UNITED STATES PATENT OFFICE.

GEORGE M. MACDONALD, OF SAN BERNARDINO, CALIFORNIA.

ARTIFICIAL HONEYCOMB AND THE ART OF MAKING THE SAME.

1,360,426.

Specification of Letters Patent. Patented Nov. 30, 1920.

Application filed October 23, 1919. Serial No. 332,849.

*To all whom it may concern:*

Be it known that I, GEORGE M. MACDONALD, a citizen of the United States, residing at San Bernardino, in the county of San Bernardino and State of California, have invented new and useful Improvements in Artificial Honeycombs and the Art of Making the Same, of which the following is a specification.

This invention relates to improvements in artificial honeycombs being more particularly an improvement upon, and in the art of making the type of honeycomb disclosed by my previous Patent No. 1,224,479, issued May 1, 1917.

This type of honeycomb is composed of a plurality of superimposed thin metallic strips, each being crimped to form a series of transverse grooves alternately arranged upon opposite sides of the strip and extending outwardly from each side of the longitudinal center thereof. Each of these grooves forms a semi-cell which is open at its outer end and practically closed at its inner end and when the strips are superimposed the semi-cells of one strip register with those of the adjacent strips to form complete cells open at their outer ends and practically closed at their inner ends.

The principal object of this invention is to provide a method and form of construction whereby the various component elements may be most cheaply constructed and quickly and rigidly assembled. It also provides all of the advantages pointed out in the above mentioned previous patent, viz., an indestructible honeycomb which may be used a great many times, one from which the honey may be easily extracted by centrifugal or other means and which may be easily and thoroughly cleaned and sterilized, which is especially desirable in case it becomes infested or diseased as sometimes happens.

The device is further provided with other novel and advantageous features of construction and arrangement as will be hereinafter more fully described and particularly pointed out in the claims.

Other objects, advantages and features of invention may appear from the accompanying drawings, the subjoined detailed description and the appended claims.

The accompanying drawings illustrate the invention.

Figure 1 is a side elevation of a honeycomb embodying this invention with parts broken away.

Fig. 2 is an enlarged perspective of a portion of the crimped metallic ribbon which forms the cells.

Fig. 3 is an enlarged perspective of the said crimped ribbon bent upon itself to form substantially two superimposed strips, the semi-cells of each respective strip registering with each other to form complete cells.

Fig. 4 is a transverse section on line  $x^1-x^1$ , Fig. 3 showing more particularly the burs and binding rod.

1 represents the frame, rectangular in shape and preferably made of wood, projecting lugs 2 being provided at its upper end by which it is supported in the bee hive.

3 represents the metallic strips, a plurality of which being crimped and superimposed and mounted within the frame form the cells that constitute the honeycomb. The strips 3, preferably made of very thin sheet aluminum or like metal are formed integrally of a continuous ribbon of such metal, the strips being joined one to the other end to end by flat uncrimped bent portions 4 of the metal.

Each strip is crimped to form transverse grooves 5 alternately disposed upon opposite sides of the strip and alternately arranged upon opposite sides of the longitudinal axis thereof. Each groove so formed constitutes a semi-cell, preferably semi-hexagonal in shape, being open at the ends at the edges of the strips and practically closed at their bottom at the center of the strips by the wall 6 formed of the metal of the strips.

The strips are superimposed within the frame by folding the ribbon at the middles of the blank spaces 4 and extending the strips one upon the other from edge to edge of the frame and when so superimposed the semi-cells of the strips respectively register with those of adjacent strips and form complete hexagonal cells open at the edges of the strips and practically closed at the center of the strips.

The strips are held in proper relative position and retained within the frame by wires 7 which extend through holes 8 in the strips and also through holes 8', 8'' in the bottom and top members of the frame, the ends 7', 7'' of the wires being bent into recesses 9, 9' in the frame to hold said wires in place.

The holes 8 are preferably punched in the strips at the time they are crimped and are similarly located in each strip relative to its ends and grooves so that when they are  
 5 caused to register in arranging the strips, the semi-cells will also accurately register with each other.

The holes 8 for each strip are punched from the side of ribbon opposite that from  
 10 which the holes for the adjoining strips are punched. This is done before the ribbon is folded to form the superimposed strips so that the burs 10 formed by punching the holes will extend from opposite sides of suc-  
 15 cessive strips respectively before the ribbon is folded; and after the ribbon is folded and the strips are superimposed upon each other said burs will all extend in the same direc-  
 20 tions from edge to edge of the body formed by the folded ribbon. This arrangement will allow the end 7" of the rod 7, before said end is bent over to be easily passed through the holes without being caught up-  
 25 shown.

It will be seen that the metallic strips can be rapidly formed of a continuous metallic ribbon by passing it between die rollers or like means which will crimp and punch it  
 30 as heretofore described. The wooden frames are cheaply constructed and the strips may be quickly folded at the blank portions 4 and placed in superimposed relation in the frame, the semi-cells being accurately regis-  
 35 tered by passing the wires through the holes 8, the rods also binding the superimposed strips together and holding them in the frame.

A sufficient number of the strips will be  
 40 placed in each frame to completely fill the space between the top and bottom members thereof being thus pressed and held in close contact and not requiring any other joining means.

The honeycomb thus formed is dipped  
 45 into melted wax which forms a coating on the walls of the cells and it is then hung by its projecting lugs 2 in the bee hive to be filled with honey by the bees, after which  
 50 the honey may be removed by centrifugal or other means, and other wax coating applied and the honeycomb replaced in the hive to be filled again.

I claim.

55 1. An artificial honeycomb comprising a plurality of strips having grooves therein said strips being integrally formed end to end and adapted to be folded to assume superimposed positions relative to each other,  
 60 the said grooves to register with similar grooves in adjacent strips to form complete cells.

2. An artificial honeycomb comprising a  
 65 plurality of strips formed of a continuous ribbon of sheet material and crimped to

form transverse grooves and uncrimped por-  
 tions of the material between each two crimped strips to be folded to allow the strips to assume superimposed positions relative to  
 70 each other and said grooves to register with similar grooves in adjacent strips to form cells.

3. An artificial honeycomb comprising a  
 plurality of strips formed integrally of a  
 continuous ribbon of sheet material and  
 75 crimped to form transverse grooves alter- nately disposed on opposite sides of the strips and alternately extending from each side of the longitudinal center of the strip, said grooves being open at the edges of the  
 80 strips and practically closed at the center thereof and uncrimped portions of the ma- terial between and joining each two strips and adapted to be folded to permit the strips to assume superimposed positions relative  
 85 to each other and the grooves to register with similar grooves in adjacent strips to form complete cells.

4. An artificial honeycomb comprising a  
 frame; a plurality of strips formed inte-  
 90 grally end to end of a continuous ribbon of sheet material and adapted to be folded to permit the strips to assume superimposed positions relative to each other, said strips having grooves to register with similar  
 95 grooves in adjacent strips to form cells and means for retaining said strips in closely re- lated superimposed position in said frame.

5. An artificial honeycomb comprising a  
 plurality of strips formed integrally end to  
 100 end of a continuous ribbon of sheet material and adapted to be folded to assume super- imposed positions relative to each other, said strips having grooves to register with simi- lar grooves in adjacent strips to form cells,  
 105 said strips also having holes located simi- larly in each strip relative to its ends and grooves, and rods extending through said holes to bind the strips in superimposed re- lation and to register the grooves.  
 110

6. An artificial honeycomb comprising a  
 frame, a plurality of strips integrally  
 formed end to end and adapted to be folded  
 to assume superimposed positions relative to  
 each other, said strips having grooves to  
 115 register with similar grooves in adjacent strips to form cells and said strips also hav- ing holes located similarly in each strip rela- tive to its ends and grooves, and wires ex- tending through holes in said frame and  
 120 through the holes in the strips to hold the strips in superimposed relation in the frame and register the grooves with each other.

7. An artificial honeycomb comprising a  
 plurality of strips integrally formed end to  
 125 end and adapted to be folded at the juncture between their ends to assume superimposed positions relative to each other, said strips having grooves to register with similar grooves in adjacent strips to form cells and  
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5 said strips also having holes located similarly in each strip relative to its ends and grooves the burs formed by punching said holes occurring alternately on opposite sides of each successive strip before the strips are folded and all extending in one direction when the strips are folded and superimposed, and wires extending through said holes to bind the strips in superimposed relation and to register the grooves with each other.

15 8. An artificial honeycomb comprising a frame, a plurality of elongated strips integrally formed end to end of sheet material and crimped to form transverse grooves alternately disposed upon opposite sides of the strips and alternately extending from opposite sides of the longitudinal center being open at the edges of the strips and practically closed at the center thereof, said strips also having holes similarly located in each strip relative to its ends and grooves and the burs formed by punching said holes occurring alternately on opposite sides of each successive strip before the same are folded and all extending in one direction after the strips are folded and superimposed, uncrimped portions between each two strips to be folded to permit the strips to assume superimposed positions relative

to each other and the grooves to register with similar grooves in adjacent strips to form cells and wires extending through holes in the frame and through the holes in the strips to hold the strips in superimposed relation in the frame and to register the grooves with each other.

9. The method set forth of making metallic honeycomb which consists in crimping a metallic ribbon to form a series of semi-cell crimps in pre-determined lengths with blank spaces between said series then punching the crimped spaces alternately, one series being punched in one direction and the next series in the other direction, so that the burs formed by the punch will be reversely arranged upon the successive strips; then folding the ribbon upon itself to bring the holes into register with each other, with the burs all in one direction and then inserting wires through said holes in the direction of the burs and securing said strips in a frame by means of said wires.

In testimony whereof, I have hereunto set my hand at San Bernardino, California, this 17th day of October 1919.

GEORGE M. MACDONALD.

Witness:

JAMES R. TOWNSEND.