

W. G. COOK.
 ARTIFICIAL COMB AND THE ART OF PRODUCING THE SAME.
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1,427,149.

Patented Aug. 29, 1922.

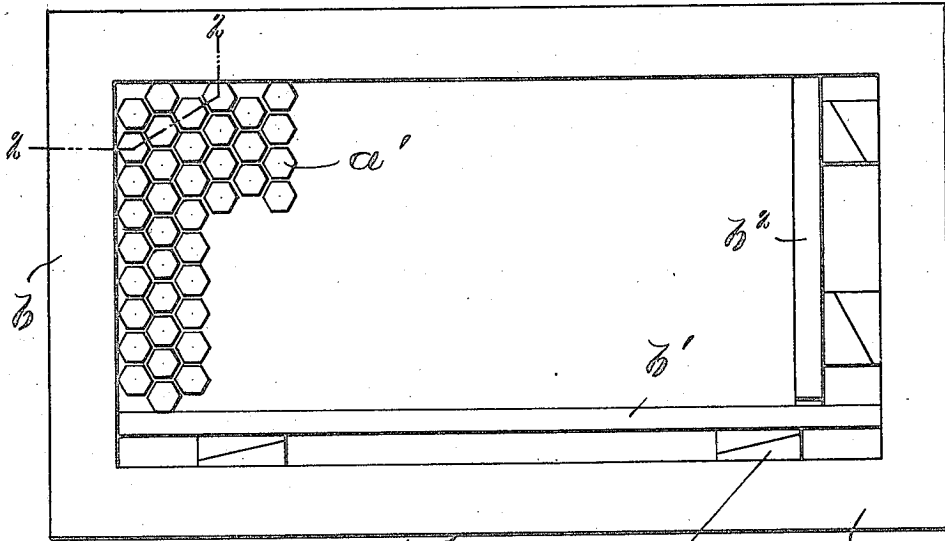


Fig. 1.

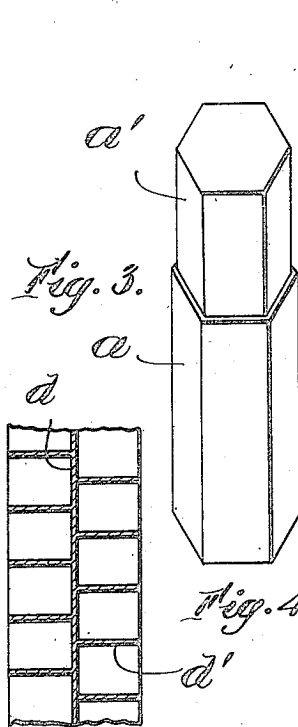


Fig. 3.

Fig. 4.

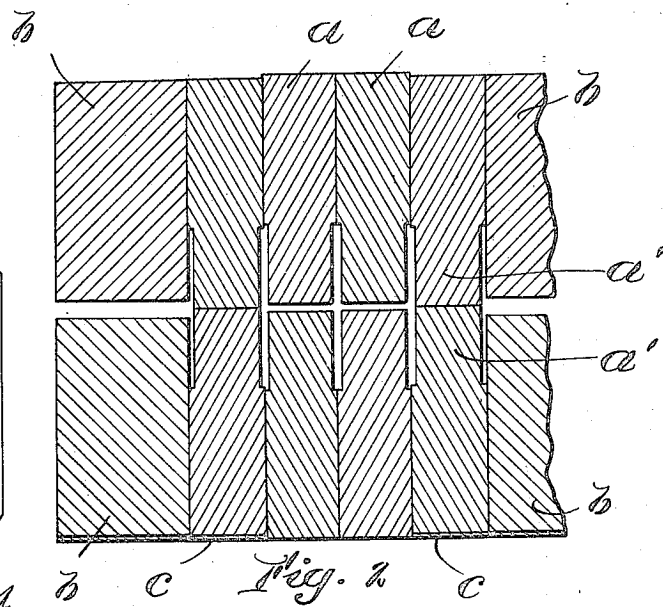


Fig. 2.

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UNITED STATES PATENT OFFICE.

WALTER G. COOK, OF WATERTOWN, MASSACHUSETTS.

ARTIFICIAL COMB AND THE ART OF PRODUCING THE SAME.

1,427,149.

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Application filed November 17, 1919. Serial No. 333,701.

To all whom it may concern:

Be it known that I, WALTER G. COOK, a citizen of the United States, and resident of Watertown, county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Artificial Combs and the Art of Producing the Same, of which the following is a specification.

This invention relates to artificial honey-combs and the art of producing such combs and is intended to provide an artificial comb of wax or equivalent material that will be acceptable to the bees for the storage of honey while at the same time being economical both in manufacturing cost and in the saving of the time and labor of the bees besides conserving the honey supply.

It is common practice to form by means of dies so-called "foundations" of thin sheets of wax having slight indentations or impressions on its opposite sides upon which the bees erect the storage cells, but even the use of these foundations involves a large loss in honey production since the bees must consume much labor and wax in building the cells themselves which otherwise would result in a greatly increased amount of honey. Moreover, owing to the dislike of the bees to building cells on the artificial foundation, the tendency to swarming is greatly increased by the use of such foundation.

It has also been proposed to make artificial combs by the use of dies or molds but the difficulty of removing the dies from the wax comb without tearing out or breaking down the cell structure has been so great that efforts along this line have not been commercially successful.

The present invention obviates the above-mentioned difficulties by making the dies or molds of a material that is normally sufficiently hard or coherent to serve purposes of die or mold when making the comb and that is capable of being disintegrated and preferably by a solvent without injury to the comb so that the die material may be removed leaving the comb structure intact for use in the frames of a hive.

In the accompanying drawings I have illustrated the preferred construction of the dies or molds which I employ in the practice of my invention in which:

Figure 1 is a plan view of one of the assembled molds or dies;

Figure 2 is a vertical section taken on the

line 2—2 of Figure 1 to illustrate how the outside sections of the mold or die are brought together to inclose the space left open for the mid rib or foundation;

Figure 3 is a perspective view of one of the die sections or prisms;

Figure 4 is a cross section through a piece of the finished comb.

In the practice of my invention according to the present form, I form a series of hexagonal prisms *a* out of suitable soluble material each prism forming a unit of the die or mold when assembled with the others.

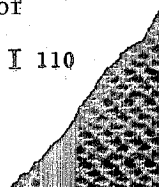
The preferred material for the manufacture of these prisms or die sections is sodium chloride or common salt preferably of the kind used for table salt which contains a slight admixture of carbonate of magnesia usually about 1%. This variety of salt is especially well adapted to the purpose because the magnesia carbonate prevents undue absorption of moisture and also because it results in a prism of very smooth surface free from cracks or holes.

While the prisms may be made by any suitable method, in practice I prefer to feed a definite quantity of the salt or other material into suitable dies or molds which are then subjected to very heavy pressure to solidly compact the material into a cake or prism of the desired form. It will be understood that while the making of the dies or molds in individual units or sections in the manner described is in some respects advantageous, yet I do not limit myself to making the dies in this form since it will be possible to make an entire row of the prisms at one operation or even to make the entire die at once in suitable molds or by suitable dies.

As shown in the drawings the base *a* of the hexagonal prism is made very slightly larger than the projecting end or die portion *a'* of the prism which forms the die around which the wax flows in the operation of making the comb. This reduction in cross-sectional area should be very slight so as to make a thin cell-wall for the comb.

The prisms of this shape are then assembled in rows as indicated in Figure 1 with their bases in firm contact with each other leaving thin interstitial spaces around each projecting die portion of the prism for the reception of the wax or other material of which the comb is to be made.

For holding the die sections together I



employ a locking and holding frame similar to the locking frame used by type-setters for locking up the type. The desired number of prisms are placed within such frame with the ends of their bases resting on a smooth level surface. The locking or holding strips b' b^2 are then inserted against two adjacent sides of the assembled prisms and firmly pressed against them by means of the wedges or quoins b^3 .

In order to form a suitable mid-rib as a foundation for supporting the opposite series of cell-walls and also in order to prevent the escape of the material around the edges of the die, I effect an arrangement of the prisms which will leave the outside or peripheral row of prisms projecting beyond the inner ends of the die portions of the interior prisms. This may be conveniently accomplished by placing a very thin strip of material under the base ends of the peripheral prisms as indicated at c in Figure 2. The prisms that rest upon these thin positioning strips c will of course have their die ends projecting beyond the ends of the other prisms by the thickness of the interposed positioning strip so that, as shown in Figure 2, when two dies are brought together the opposed adjacent ends of the peripheral row of prisms will touch each other leaving a narrow horizontal space between the opposed ends of the interior prisms which will be filled by the mid-rib or foundation of the comb.

When two opposed dies are built up in the manner described and securely locked in their respective locking frames, one of them is placed on the bed of a suitable press and a flat cake or slab of wax of suitable size to afford the proper amount of material for making the comb of the desired size is placed over the upwardly projecting die ends a' of the lower die and a similar die is placed above the slab of the wax, the two locking forms or frames being properly aligned with each other so as to offset the cells d' of the comb on opposite sides of the mid-rib or foundation d as illustrated in Figure 4.

After the form for one of the dies has been locked up the positioning strips c may be removed from the outer rows so that when the pressure is exerted to press this die down against its cooperating die the raised outer row of prisms may yield or slip back so that their opposite ends will lie flush with the corresponding ends of the interior prisms of the same die. The object of this arrangement is to prevent the escape of wax around the edges of the die during the operation of forcing the dies together while still leaving a very thin space to form the mid-rib.

In the operation of forming the comb between the dies, the dies and the interposed

slab of wax or other material are heated to a temperature of approximately 120° to cause the material to flow freely into all the interstices forming the mold for the comb. After the comb has thus been formed the frames are removed from the press and the two opposed die members with the interposed comb are then taken from the locking frames and immersed in a liquid bath or exposed to a stream of running liquid for the purpose of dissolving and washing out the soluble die from the cells of the comb. When salt is used as the material for making the dies this dissolving and washing out process may be readily effected by the use of water. In any case the agent used for liquefying or dissolving the die members should be of a nature not to injuriously affect the comb itself.

While wax is the most suitable material to use in this process because of the natural liking of the bees for working on this substance it will, of course, be understood that any other substance that is capable of being melted or rendered plastic that is acceptable to the bees may be employed without departing from the principle of this invention.

The backing or positioning strips c may be of any suitable material. Moreover, any other desired method of effecting the proper arrangement of the prisms may be used to secure the intended objects. It will, of course, be understood that the dimensions shown in the drawings are considerably exaggerated for the purpose of more clearly showing the detail of die construction.

What I claim is:

1. The process of producing artificial honey combs which consists in forming the material selected for the comb into a cellular comb-like structure by molding it between suitable dies and then disintegrating the die material itself so as to separate the dies from the comb structure without tearing or breaking the cell-walls substantially as described.

2. The process of producing honey combs which consists in forming the material selected for the comb into a cellular comb-like structure by molding it between suitable dies and then dissolving out the die material from the comb structure thereby leaving the comb structure intact, substantially as described.

3. The process of producing artificial honey combs which consists in forming suitable dies of soluble material such as salt compressed to a sufficient degree of cohesion and hardness, then subjecting a quantity of suitable comb material interposed between the dies to heat and pressure to cause the comb material to flow into the interstices of the dies and thereafter subjecting the conglomeration mass of dies and comb to the

action of a dis-integrating agent affecting only the die material and thereby separating the die material from the comb structure.

5 4. A die for forming honey combs comprising opposed members of soluble material compressed to a suitable degree of hardness and cohesion to form a molding agent for producing a comb-like structure out of an

10 5. A die for producing honey combs comprising a series of parallel hexagonal prisms assembled side by side with reduced end portions leaving interstitial spaces between the individual prisms, said die being formed of
15 a soluble material subjected to pressure to give it the requisite degree of cohesion and hardness, substantially as described.

20 6. A die for producing honey combs comprising a series of separate individual hexagonal prisms of compressed soluble material such as salt assembled side by side with their end portions slightly reduced to form interstitial spaces surrounding each prism,

and means for securely locking the prisms into operative relationship against each other, substantially as described. 25

7. A die for producing artificial honey combs embracing in its construction a comb-forming die having a series of parallel comb-forming portions of soluble material and hexagonal cross section to conform to the cell structure to be produced, the peripheral portions of said die being slightly beyond the interior portions, substantially as and for the purpose described. 30

8. A die made for forming a honey comb embracing in its construction a prism of compressed soluble material of polygonal cross section, one end portion thereof being slightly reduced in diameter to leave a peripheral shoulder or edge intermediate of the ends of the prism, substantially as and for the purpose described. 35 40

In witness whereof I have subscribed the above specification.

WALTER G. COOK.

