

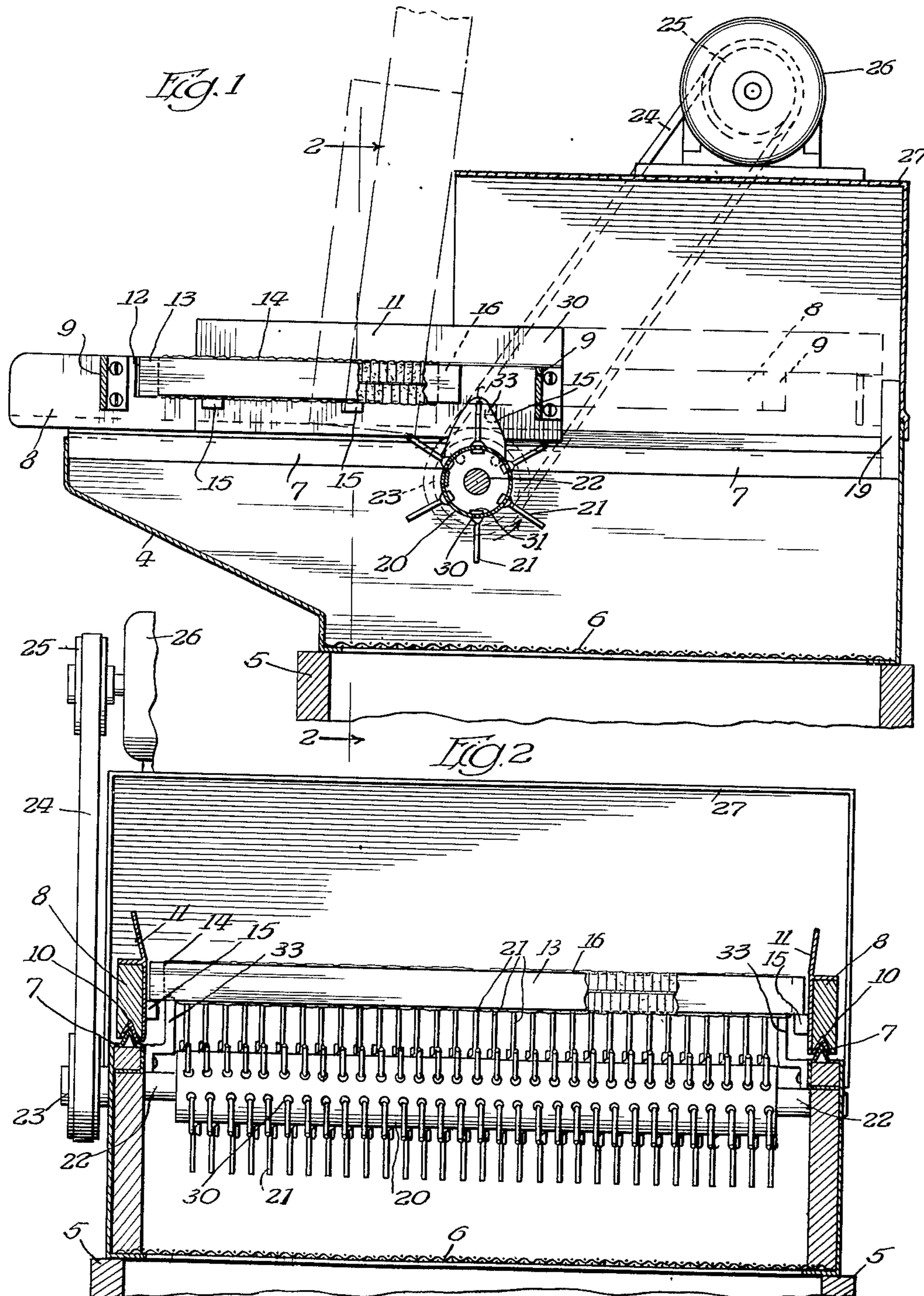
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COMB DECAPPER

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## COMB DECAPPER

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8 Claims. (Cl. 6—12)

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This invention relates in general to the removal of the caps from filled cells of honeycomb and is more particularly described as a rotary uncapping or decapping device for that purpose.

It is a common practice to provide a heated rotary knife or a heated blade to slice caps from the comb or to use a wire brush for this purpose. These methods are objectionable because they remove too much of the comb and with it the honey, and if wire brushes are used, they soon become clogged with wax and honey and are therefore unsanitary requiring frequent cleaning, and when clogged, they are unsatisfactory in operation.

In the present invention, each frame containing the filled honeycomb is moved over a rapidly rotating decapping device which has teeth in rows spaced apart and from each other, but overlapping in adjacent rows to engage the entire surface of a comb as it is moved over the device, thereby engaging, cutting off, and removing small particles of the comb without removing any great quantity of the honey therefrom.

An important object of the invention is in the provision of a decapping device in which the removed material is in finely divided particles or flakes from which the honey is easily separated and the wax recovered for use.

Further objects of the invention are to eliminate the use of uncapping knives, either hand, machine, or heated types; to provide a sanitary rotating decapper; to provide means for protecting the comb containing frames during the uncapping operation; to reduce the damage to the comb during the uncapping operation; to simplify the uncapping mechanism and thereby to expedite the operation and reduce the cost of such apparatus.

Other and further objects of the invention will appear in the specification and will be apparent from the accompanying drawing, in which

Fig. 1 is a sectional view illustrating a decapper in accordance with this invention; and

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1.

In carrying out this invention, a frame containing honeycomb is placed upon a carriage and moved into the path of a rapidly rotating drum with projecting spaced teeth which cut and remove the caps from the comb in finely divided particles. When the caps on one side of the frame are removed in this manner, the frame is inverted and the caps on the other side of the frame are removed in the same manner. The honey is removed from the decapped frame by

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placing it in a centrifugal separator. The particles of the caps are retained or caught in a suitable container, and adhering honey is easily and quickly separated therefrom because of the finely divided condition of the comb particles.

Referring now more particularly to the drawing, a lower casing 4 is mounted at the top of a drip receiver or container 5 with a screen 6 at the bottom of the casing for receiving particles of comb from which the honey may drip through the screen into the container below.

Along the upper opposite sides of the casing are rails 7 for supporting a carriage having side bars 8, connecting cross-pieces 9 at front and rear, and bottom guide rails 10 slidable upon the corresponding rails 7, and each rail 10 comprising a sheet metal plate 11 which extends upwardly at the inner side of one of the side bars 8. The carriage is freely slidable upon the rails 7; the ends of the side bars 8 project beyond the cross bar 9 at one end to provide hand holds for lifting and moving the carriage, and the side bars are formed near the cross-pieces 9 with slots 12 for seating the projecting ends 13 of a honeycomb frame 14 therein.

The adjacent outer sides of the frame 14 are supported by projections 15 at the inner sides of the plates 11 so that the frame is supported in the carriage by these projections 15 engaging below the lower edge of the frame. The frame 14 also has a cross-bar 16 at its inner end which is of the thickness of the frame, the capped ends of the comb usually projecting slightly beyond the side faces of the frame when they are filled with honey.

Mounted in the lower casing 4 is a rotatable drum 20 with a plurality of rows of prongs or teeth 21 projecting therefrom, the teeth of each row being separated from each other, and the teeth in adjacent rows being staggered or offset with respect to those in the adjacent rows so that they substantially overlap and cover the entire surface when the drum is rapidly rotated. The drum is rotatable upon a shaft 22 mounted in bearings at the sides of the casing 4, one end of the shaft projecting beyond the casing and having a pulley 23 secured thereto. A driving belt 24 engages the pulley and also a driving pulley 25 of a motor 26 for rotating the drum at high speed. The motor is preferably mounted upon an upper casing part 27 which extends partially over the lower casing 4 and preferably over the drum 20.

In forming the decapping drum, a metal plate or sheet is provided with staggered rows of spaced

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openings 30 through which the teeth or prongs 21 with heads 31 are inserted. The teeth are soldered or otherwise secured in the plate, and the plate is curved or rounded to form a drum of the desired size. The ends of the teeth are flat or curved at the outer ends about the shaft 22 as an axis, leaving the extremities blunt or curved in this manner. By spacing the teeth and staggering them so that the teeth of adjacent rows will substantially overlap, an entire surface, the length of the drum, is engaged by a single rotation, or less, of the drum. In this manner, every portion of the surface of a frame filled with honeycomb will be engaged when the frame is moved upon a carriage into the path of the teeth. This method of engagement will cause only the outer ends of the comb, that is, the caps to be engaged; the wax will be cut up into fine particles, and no substantial portion of the honey will be wiped or removed from the comb by the operation.

In order to prevent the rapidly rotating teeth of the decapping drum from wearing down or engaging the inner cross-piece 16 of the honeycomb frames, a rounded projection 33 is mounted at the inside of the casing 4 and preferably is secured to the supporting rail 7. This projection extends to the outer periphery of the teeth 21, but is in the path of the cross-piece 16 so that as the frame 14 is moved rearwardly or inwardly into casing 27 with the carriage, it will engage the upper rounded surface of the projection 30, the frame will be raised thereby out of the path of the teeth 21, and as the carriage movement inwardly is continued, the frame will move downwardly or will be supported at such a level in the carriage that the comb at the inside of the cross-piece 16 will be uncapped substantially flush with the outer side of the frame without damaging the frame itself and without damaging the walls of the comb, but removing only the caps thereof which tend to bulge or project slightly beyond the outer side faces of the comb.

At the inner end of the rails 7, a fixed stop 19 may be provided for engaging and limiting the inward movement of the carriage into the casing, which will protect the outer end of the honeycomb frame which is seated in the slots 12 of the carriage, and therefore having a fixed location for the honeycomb frames regardless of their width.

With this construction, it is a simple and easy matter to perform the decapping operation, no heating of any part of the decapper is necessary, and the separation of the blunt teeth of the decapping drum prevents clogging thereof and makes the drum easy to clean. Since the material of the caps is removed in small flakes or particles at the lower side of the frame filled with honeycomb, there is no tendency for these particles to fly upwardly or outwardly and the upper casing 27 will engage and return any particles which might tend to fly outwardly. The upper casing is preferably slidable upon the lower casing and is easily removed by simply disconnecting the belt 24 from the driving pulleys. As the particles with a small amount of honey adhering thereto fall in the lower casing, they engage a screen 6 at the bottom, some honey will drip through the screen into the container, and the remainder is separated from the particles of wax in any desired manner.

I claim:

1. A honeycomb decapper comprising a rotatable member with blunt teeth spaced apart and

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staggered, a carriage movable over the member, means for loosely supporting a honeycomb frame in the carriage, and projecting means at the ends of the member for engaging the crosspiece of a frame to lift it in the carriage out of the path of the teeth.

2. In a honeycomb decapper, a rotatable member with projecting spaced teeth to engage the caps at one side of a honeycomb frame, means for mounting a frame for movement to engage the teeth, and rounded fixed projections at the ends of the member for engaging the crosspiece of a frame to raise it out of the path of the teeth.

3. In a honeycomb decapper, a rotatable member with projecting spaced teeth to engage the caps at one side of a honeycomb frame, movable means for loosely supporting a frame at its sides for movement to engage the teeth, projections at the ends of the member but free from said movable means for engaging the crosspiece of a frame to raise it out of the path of the teeth for the width of the crosspiece only, the frame descending after the crosspiece passes the projections to engage the teeth with the caps close to the crosspiece.

4. A honeycomb decapper comprising a rotatable member with blunt teeth spaced apart and staggered, a carriage movable toward and from the member, means for loosely supporting a honeycomb frame in the carriage, projections for engaging a frame cross-piece to raise it in the carriage out of the path of the teeth, the frame returning after the crosspiece passes the projection to engage the ends of the teeth with caps in the frame, a container below the rotatable member for receiving the decapped material, and a strainer extending across the container.

5. A honeycomb uncapping device to remove the ends of the honeycomb in fine particles, comprising a rotatable member with a plurality of rows of teeth spaced apart around the member, the teeth of each row being spaced apart more than the width of each tooth, and the teeth of adjacent rows being staggered so that the teeth of three or more rows are required to cover the spaces between the teeth of one row for engaging the entire width of the capped surface in one rotation of the rotatable member.

6. A honeycomb uncapping device to remove the ends of the honey in fine particles, comprising a rotatable member with a plurality of rows of teeth spaced apart around the member, the teeth of each row being spaced apart more than the width of each row, and the teeth of adjacent rows being staggered and overlapping so that the teeth of three or more rows are required to fill the space between the teeth of one of the rows for engaging the entire width of the capped surface in one rotation of the rotatable member.

7. A honeycomb decapper, in accordance with claim 6, in which the rotatable member is in the form of a drum having an outer shell with perforations for the teeth, the teeth comprising headed pins inserted through the perforations with the heads inside of the shell and secured in place and the outer ends being blunt, and all movable in an outer path to engage the entire width of the capped surface in one rotation of the rotatable member.

8. In a honeycomb decapper, in accordance with claim 6, a movable carriage for supporting a honeycomb frame so that ends of the teeth engage the entire capped surface at one side of the honeycomb frame as the frame is moved by

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the carriage with respect to the rotatable member.

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