June 4, 1940. J. J. MAENDEL 2,203,438

COMB PROTECTOR

Filed Nov. 2, 1938 2 Sheets-Sheet 1

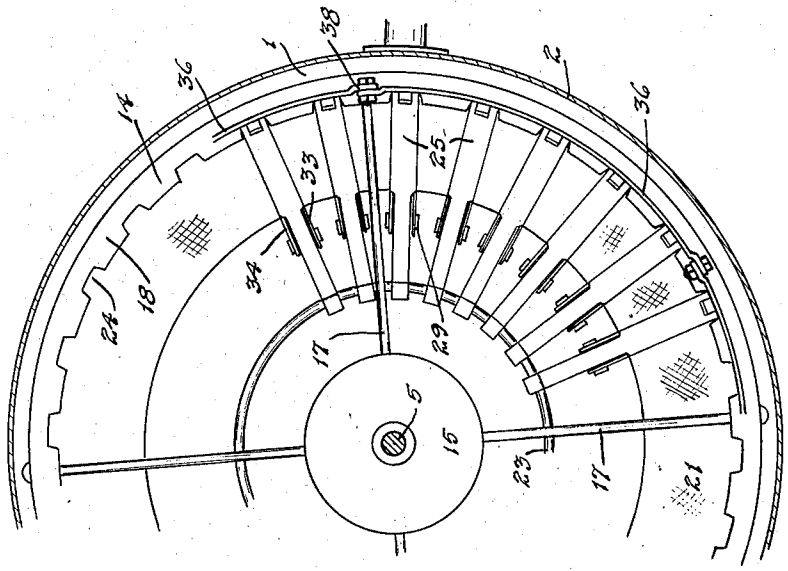


Fig. 2

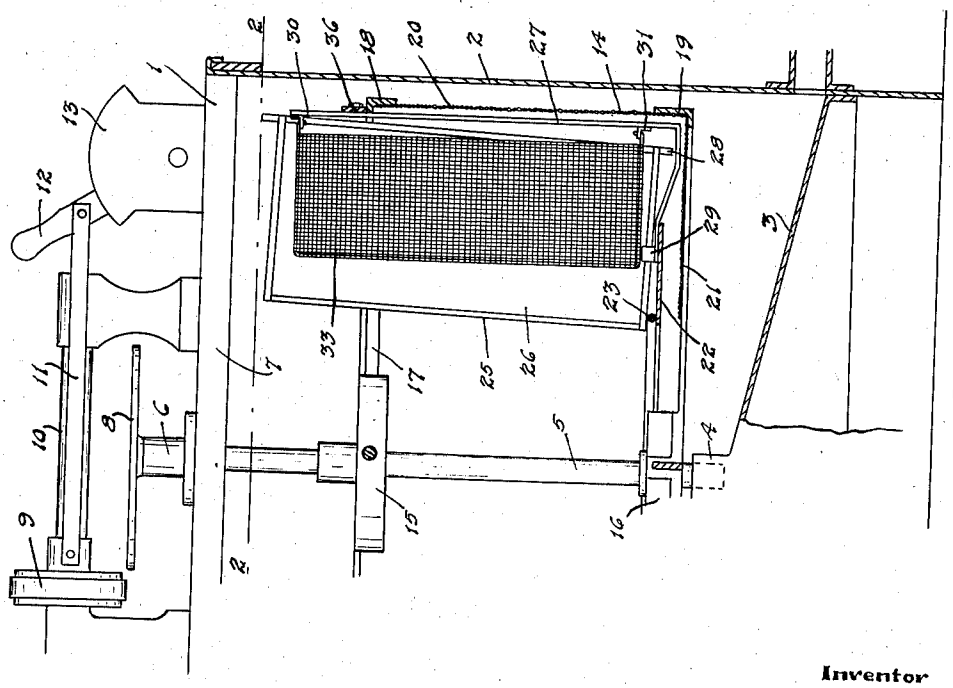


Fig. 1

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COMB PROTECTOR

Filed Nov. 2, 1938 2 Sheets-Sheet 2

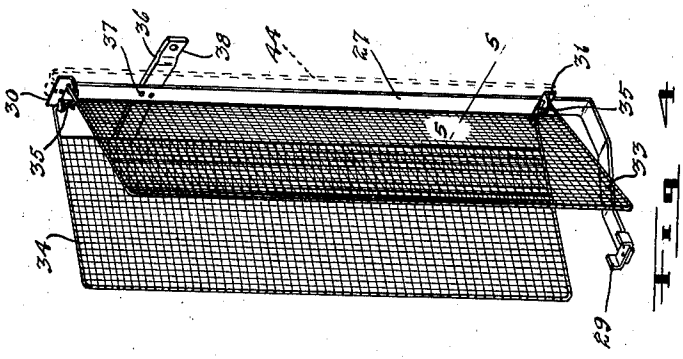


Fig. 4

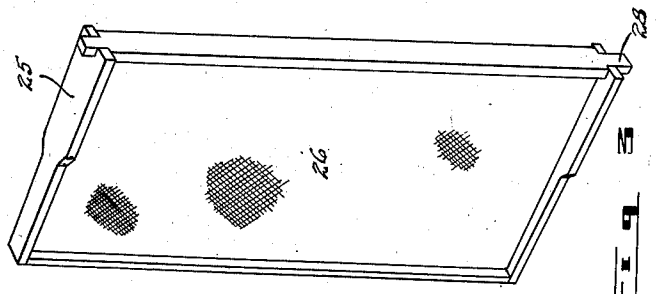


Fig. 3

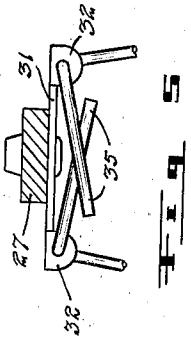


Fig. 5

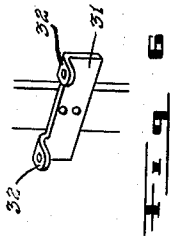


Fig. 6

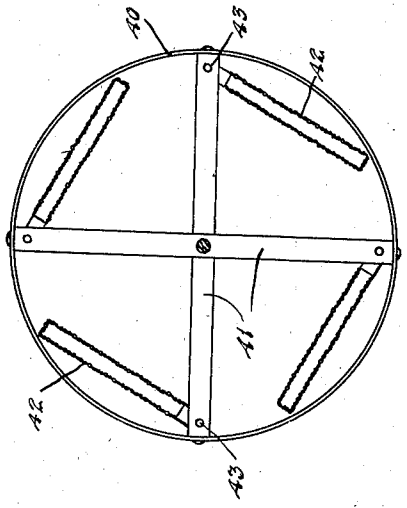


Fig. 7

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UNITED STATES PATENT OFFICE

2,203,438

COMB PROTECTOR

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Application November 2, 1938, Serial No. 238,468

5 Claims. (Cl. 210—65)

In the commercial operation of large apiaries, machines known as extractors are used for the removal of the honey from the combs. The combs usually consist of a light wooden frame having a thin partition or foundation centrally covering the interior area of the frames. Upon either side of these foundations, the bees build pockets or honey cells of wax for the retention of the honey collected. In the extraction process, the combs are removed from the hives, the cells are uncapped by a special uncapping tool and the combs are vertically placed in a circular row in the extractor and then rotated to force the honey from the cells by centrifugal force.

It might be mentioned that, when the combs are removed from the hives, they are warm and, when full of honey, comparatively heavy. If a full comb is held horizontally, the foundation and attached cells visibly sag downward with the weight. Accordingly, when the extractor is rotated a low speed is essential, at first, to prevent the cells and foundation breaking away from the comb frame due to this weight. As the honey is removed and the combs become lighter the machine can be speeded up to remove the last vestiges clinging to the cells. Although great care is exercised by the operators to insure correct speeds, even the most experienced apiarist will often have broken combs. When such comb breaking occurs a new foundation must be inserted into the frame and the bees have to rebuild new cells thereon with wax. As the bees make the wax from honey and it takes approximately five times as much honey to make a given amount of wax, the efficiency of the apiary is tremendously reduced if much comb breaking occurs.

The principal object of the present invention is to provide an independent protector caging, formed by wire mesh frames, for each comb placed in the extractor to prevent the foundation and cells from bulging out and breaking in the rotation of said combs.

A further object of the invention is to provide means on the protectors, operated by the centrifugal pressure of the combs, to press the caging firmly against the cells with a pressure in direct relation to the weight of the combs.

A further object of the invention is to construct the protectors such, that the combs can be nested therein, aligned in the machine or removed without requiring the operation of any fastening means.

A further object of the invention is to join a plurality of protectors into banks or sections whereby they can be fastened together for alignment and retention in the extractor and also, to accommodate the correct number for various sizes of extractors.

A still further object of the invention is to construct the protectors in a simple and durable manner in order that their manufacture will be inexpensive and the sale price reasonable.

With the above important objects in view which will become more apparent as the description proceeds, the invention consists essentially, in the arrangement and construction of parts hereinafter, more particularly described, reference being had to the accompanying drawings in which:

Figure 1 is a partial vertical section through an extractor showing a protector and a comb in the inserted position.

Figure 2 is a partial horizontal sectional view taken on the line 2—2, Figure 1.

Figure 3 is an enlarged perspective view of a comb before the cells are formed on the foundation.

Figure 4 is an enlarged perspective view of one of the comb protectors.

Figure 5 is an enlarged horizontal sectional view taken at the line 5—5, Figure 4.

Figure 6 is an enlarged perspective view of one of the caging pivot bars on the protector.

Figure 7 is a diagrammatic view of the construction of a small extractor.

In the drawings, like character of reference indicate corresponding parts in the several figures.

An extractor is generally indicated by the numeral 1 and comprises a vertical cylindrical casing 2 having a cone shaped bottom 3 therein. The central peak of the cone is provided with a bearing 4 which receives a vertical shaft 5, the upper end of which, is centred in a bearing 6 carried by a channel iron 7 which crosses the upper end of the casing 2. The upper end of the shaft 5, above the bearing 6, is provided with a horizontal disk 8 which is adapted to be rotated by a frictional contact with a leather faced vertical disk 9 driven from a power shaft 10, the position of the said disk 9 in relation to the disk 8 being controlled by a bar 11, operated by a lever 12 on a quadrant 13.

An extractor drum 14 is carried by the shaft 5 and comprises a pair of upper and lower hubs 15 and 16, mounted on the shaft 5, and through suitable spokes 17, these hubs support and lower encircling angle irons 18 and 19. These latter angle irons support the edges of an encircling vertical wire mesh screen 20 while a horizontal wire mesh screen 21 is carried by the lower spokes

17. A flat ring 22 is carried by the upper faces of the lower spokes 17 and the upper interior edge thereof is provided with a ring 23 of round wire. The inner horizontal edge of the angle iron 18 is notched therearound as at 24 to receive the outer vertical edges of honey combs 25, best shown in Figure 3. The inner lower edges of the combs rest upon the ring 23 when being inserted in the extractor as it tilts the combs into the notches 24. When the extractor drum is rotated the weight of the combs forces them outward and the lower edges thereof move off the ring 23 and the combs take a vertical position outside of said ring. This is all standard construction.

Due to the fact that the centre portion or foundation 26 of the combs have no protection, any sudden movement of the extractor drum, when the combs are full of honey, is liable to cause the foundation to break away from the frames. This results in both the loss of the honey cells and of honey. In order to prevent such losses the following described protector, shown in Figure 4, is employed.

A flat vertical bar 27 is adapted to be received in each of the notches 24. The lower end extends below the bottom of the combs, is bent inward at a right angle to clear the extending portion 28 of the combs, is then bent upward at a slant and then again flattened to rest on the metal ring 22. The extreme inner end is provided with a channel shaped cross member 29 to receive and align the inner lower edge of the comb. At the upper end and at a point near the bottom, the bar 27 is provided with a pair of upper and lower cross bars 30 and 31 which are provided, on either side, with inward horizontally turned lips 32 having a hole therethrough. These lips receive and pivot a pair of vertical wire mesh frames 33 and 34 having an outer edge of heavy wire with the ends passing through the holes in the lips. After passing through the lips the wires are bent inward at right angles to the frames so that they form cranks 35 for a purpose later described.

In order to keep the protectors in position and to accommodate various sized extractors, a plurality of protectors (preferably five) are joined together and spaced apart by a horizontal bar 36 shaped to a fragment of a circle. This bar is fastened to the vertical bar 27 by a pair of rivets 37 and the ends are offset slightly as at 38 and a hole bored therethrough. In this way sections of five are formed. When being inserted in the extractor, the number of sections required are fastened together by lapping the offset ends 38 of the horizontal bars 36 and passing a bolt through the holes. When the sections are all fastened they just fit and are held firmly within the encircling angle iron 18 and cannot escape while all the protectors are supported by said angle iron due to the horizontal bars 36 resting thereon.

It is then only necessary to nest the honey combs within the protectors with the bottom of the combs resting in the channel cross members 29. When the extractor drum is rotated the combs are thrown outward by centrifugal force and take a vertical position against the vertical bars 27. The outer side of the comb frames press against the cranks 35 and this, in turn, causes the wire mesh frames 33 and 34 to press against the honey cells and prevent them from bulging outward. The heavier the combs the more pressure is exerted on the cranks with a corresponding increase in the protective pressure of the frames against the cells. The honey escaping from the cells passes through the protective frames, is forced against the walls of the cylindrical casing 2 and passes down to the cone shaped bottom 3 where it is removed through a pipe 39.

In this connection it might be mentioned that various methods may be employed to close the wire mesh frames against the cells by centrifugal force. The cranks 35 might be positioned above the protectors and provided with weighted balls or the cranks of one protector connected to cranks of the next by coupling with a weight, or the frames 33 could be pivoted through holes in the horizontal flange of the encircling angle irons 18 and 19.

The drawings shown in Figure 7 indicates the construction used on small extractors. Upper and lower rings 40 are supported by suitable upper and lower cross bars 41 which are rotatably mounted at the centre to form an extractor drum. Vertical rectangular shaped wire mesh casing units 42 are pivoted at 43 between the upper and lower cross bars and the honey combs are dropped down into these units. It will be noticed that the casing units are in planes concentric to the centre of the extractor drum so that one side of the combs will be facing outward and the other side inward. When the extractor drum is rotated, the honey is removed from the cells on said outer side by centrifugal force. The machine is then stopped and the casing units are rotated on their pivot points in the extractor drum to bring the inner sides of the combs, which are still full of honey, to the outside. The drum is again rotated and the honey is removed from the full cells on such new outer sides.

The dotted line extensions 44 of the vertical bars 27, shown in Figure 4, are for the purpose of using the protectors for the small machines in place of the pivoted casing units. The horizontal bars 36 connecting the protectors are dispensed with. The dotted extensions form the vertical bars 27 into inverted U shapes. The casing units are removed and the U shaped bars 27 are straddled down over the rings 40. Bolts (not shown) clamp said U shaped members to said rings. It will be noticed that, in Figure 7, only four combs can be accommodated in the extractor due to the space required for rotation of the casing units. By using the protectors on the extractor drum, as described, a greater number can be placed therein and accordingly, the machines can be doubled or trebled in capacity. Once inserted and fastened they become fixtures in the drum and work in the same manner as those described for the large machines. If desired, the protectors shown in Figure 4, minus the dotted part, could be bolted direct to the rings 40 or the frames 33 could be pivoted on suitable plates carried by said rings.

As previously mentioned; by the old method, great care had to be exercised in order that the extractors would not break the combs due to the speed. The slowly increasing speed system meant that possibly forty minutes was required to remove all the honey. By using these new wire mesh protectors, the extractors can be run safetly at high speeds and all the honey can be extracted from the rotating combs in about ten minutes without a single breakage.

What I claim as my invention is:

1. In an extractor machine having a rotatably mounted frame for radially supporting honey combs and centrifugally removing the honey

therefrom in the operation of said machine: means for preventing comb breakage therein comprising; pairs of perforated members for each honey comb in said extractor machine; said members supported on said frame and mounted for movement in and away from the cell sides of said honey combs; and means for pressing said members against said comb sides under the action of the centrifugal force produced in the extraction operation.

2. In an extractor machine having a rotatably mounted frame for radially supporting honey combs and centrifugally removing the honey therefrom in the operation of said machine: a standard for each comb in said extractor machine; said standards supported on said frame and each having a pair of perforated members mounted thereon for movement in and away from the cell sides of the corresponding comb; and means carried by said standards and operated by the centrifugal pressure produced in said extractor machine for pressing said members firmly against the cell sides of said combs in the operation of said extractor machine.

3. In an extractor machine having a rotatably mounted frame for radially supporting honey combs and centrifugally removing the honey therefrom in the operation of said machine: standards for each comb in said extractor machine and said standards supported by said frame; said standards aligned with said combs and each having a pair of perforated members straddling the corresponding comb; said members hinged to said standards for movement in and away from the cell sides of said combs; and cranks connected to said perforated members through said hinges and connecting with the outer edges of said combs to close said perforated members against the cell sides of said combs under the centrifugal pressure of said combs in the operation of said extractor machine.

4. In an extractor machine having a rotatably mounted frame for radially supporting honey combs and centrifugally removing the honey therefrom in the operation of said machine: L shaped standards carried by said frame; each standard aligned with a comb in said extractor machine and having a channel on the lower end of the L to receive said comb; bearings carried by said standards for rotatably hinging a pair of wire mesh gates which straddle the combs and swing in and away from the cell sides thereof; cranks connected to said gates, through said hinges, and for contact with the outer edges of said combs, to close said gates against the cell sides of said combs under the centrifugal pressure of said combs in the operation of said extractor machine.

5. In an extractor machine wherein honey combs are radially carried in a revolvably mounted drum and the honey removed therefrom by centrifugal force: means for preventing comb breakage in said extractor machine comprising; L shaped standards for each comb carried by said drum; said standards mounted in connected sections; said sections being releasably fastened together for retention and alignment in said extractor machine; each standard aligned with the corresponding comb and having a channel member on the lower end of the L to receive the comb; bearings carried by said standards for rotatably hinging a pair of wire mesh gates which straddle the combs and swing in and away from the cell sides thereof; cranks connected to said gates, through said hinges, and for contact with the outer edges of said combs under the centrifugal pressure of said combs in the operation of said extractor machine.

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