# United States Patent [19]

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[11] **3,737,931**

[45] **June 12, 1973**


[54] **HONEYCOMB UNCAPPING MACHINE**


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[22] Filed: **Dec. 29, 1971**

[21] Appl. No.: **213,288**

[52] **U.S. Cl.** ..... **6/12 A**
[51] **Int. Cl.** ..... **A01k 51/00**
[58] **Field of Search** ..... 6/12 A



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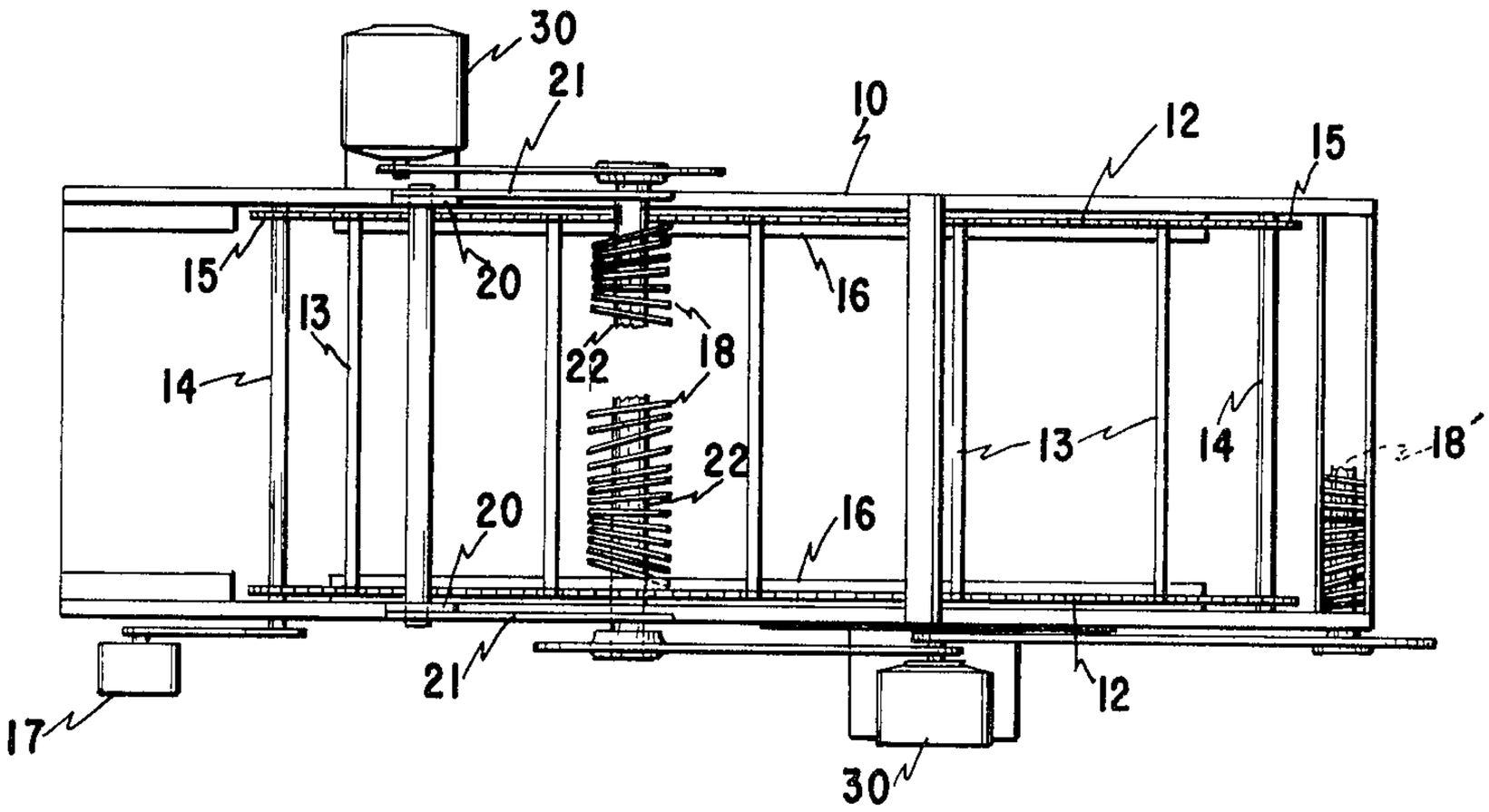
[57] **ABSTRACT**

A honeycomb uncapping device having a pair of unique arbors arranged to uncap both sides of the comb and a conveyor to carry the comb between the arbors. Each arbor carries a plurality of canted discs arranged with random circumferentia location of max imum cant.


**9 Claims, 5 Drawing Figures**



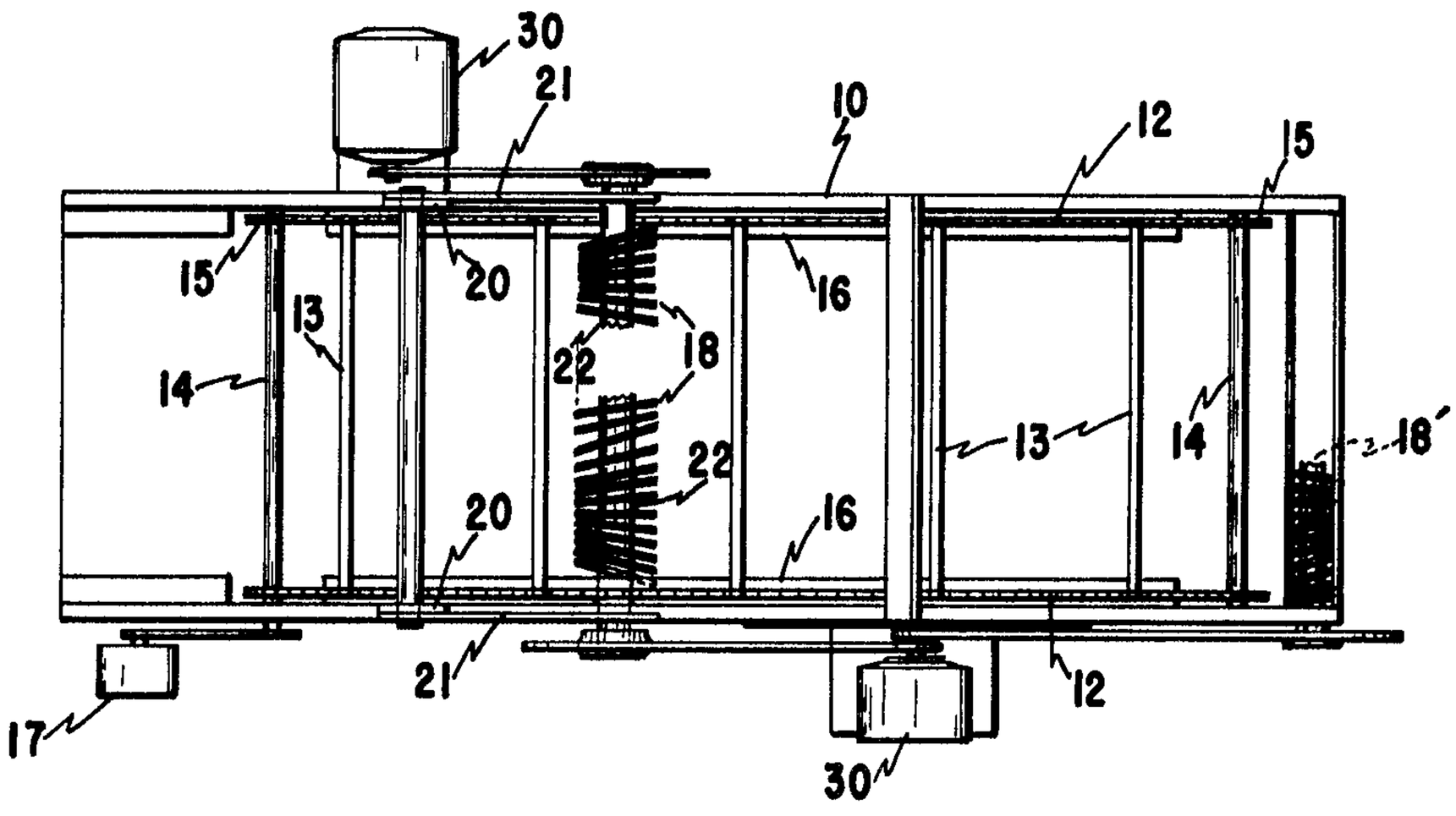



Fig. 1

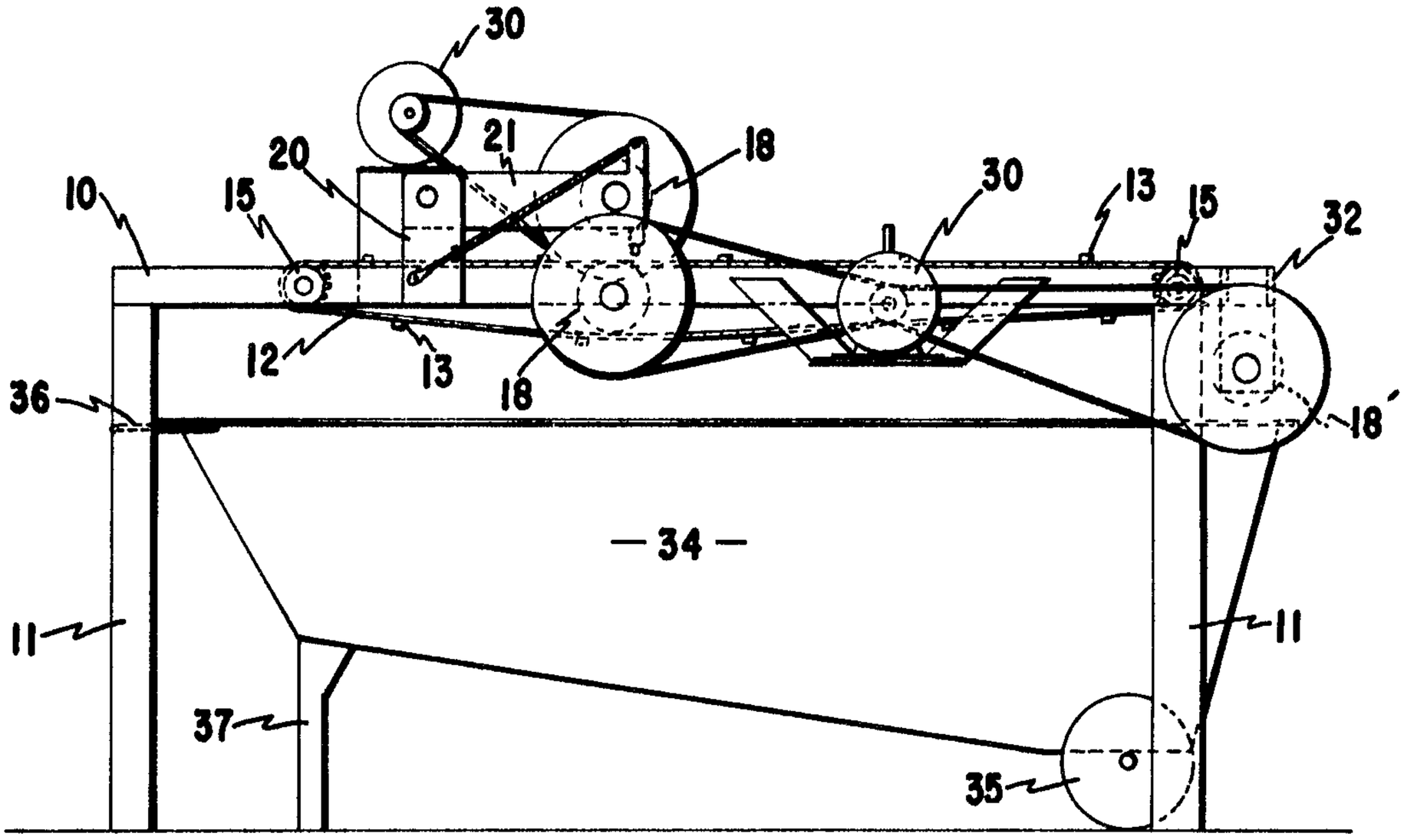



Fig. 2

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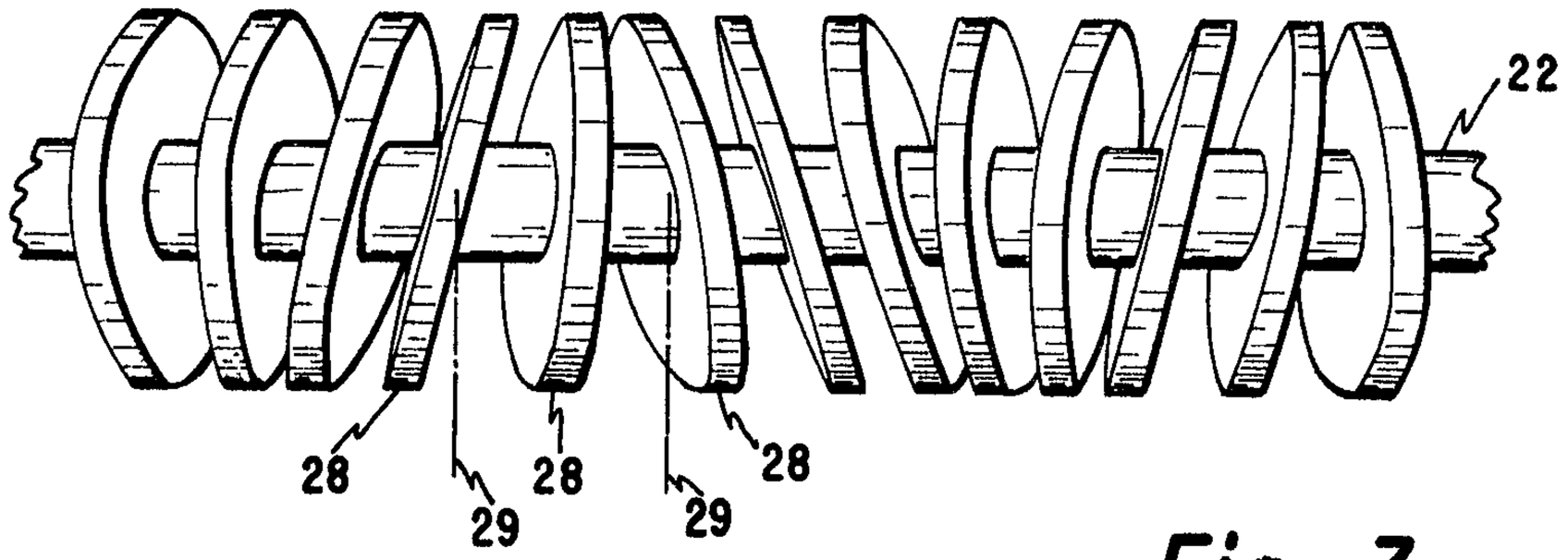


Fig. 3

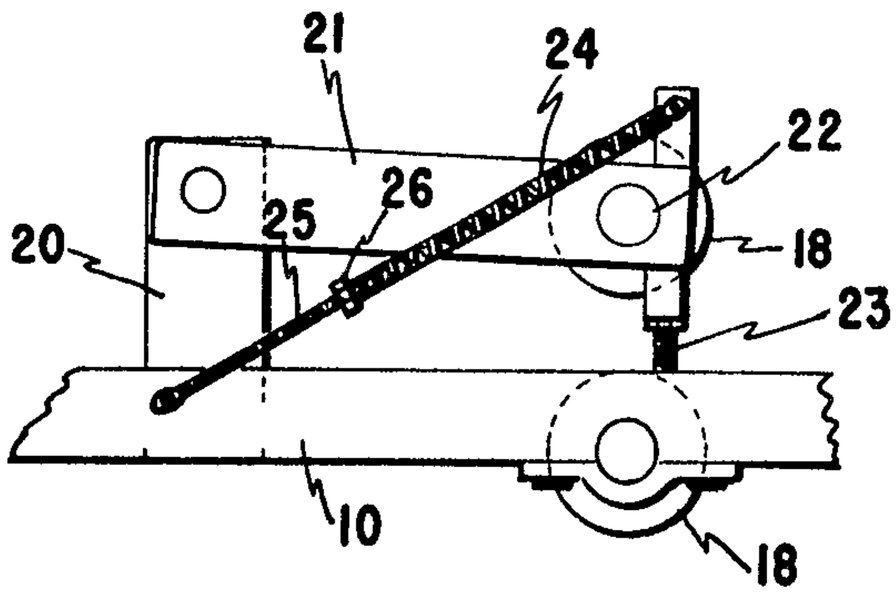


Fig. 4

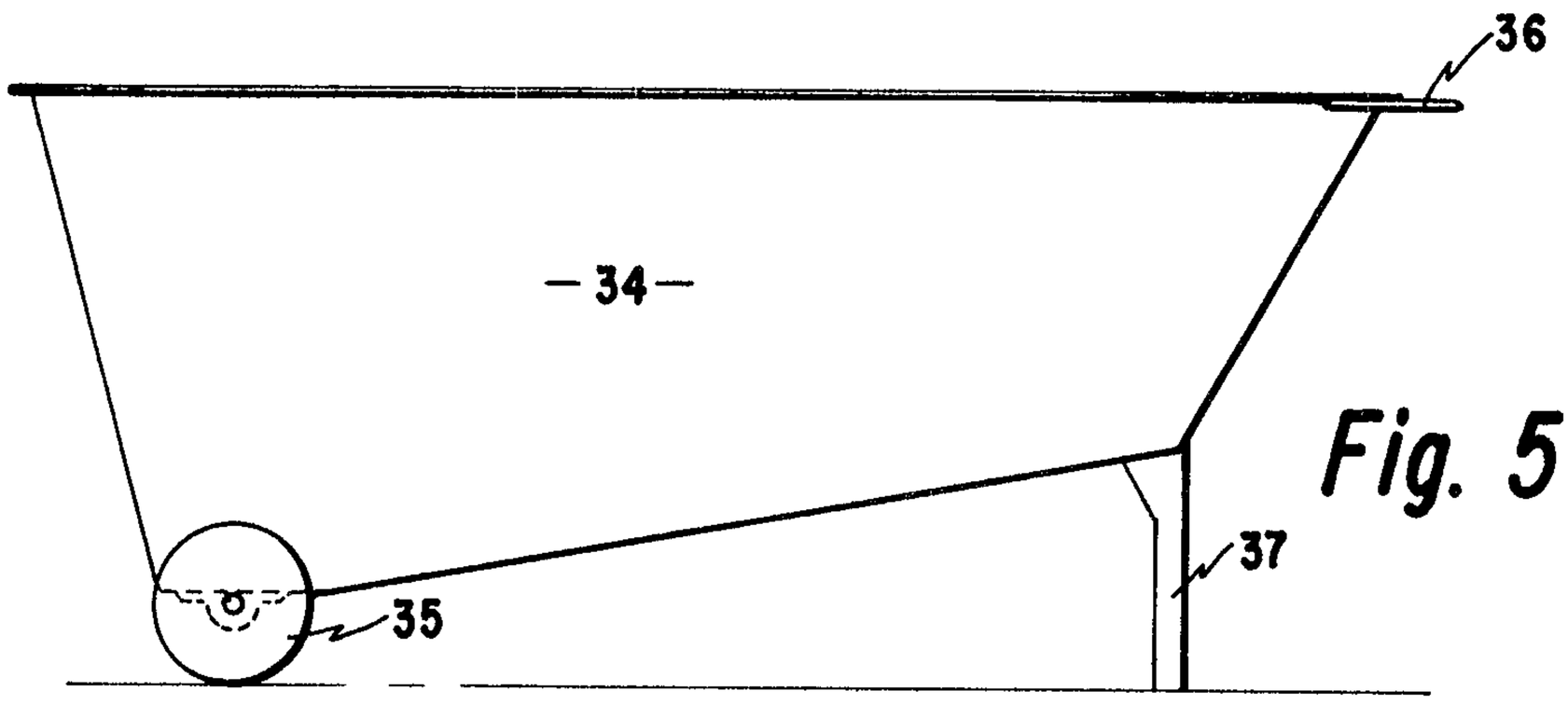


Fig. 5

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# HONEYCOMB UNCAPPING MACHINE

## BACKGROUND AND SUMMARY OF THE INVENTION

In order to extract honey from the honeycomb, one of the necessary operations is to remove the wax cap from each cell of the honeycomb. The comb is formed within each frame and when each cell is filled by the bees, a beeswax cap seals the cell. Extraction of the honey then requires that the cell be opened or unsealed by the removal of the cap.

Previous devices for the removal of the beeswax cap have included machines having rotating knives against which a frame could be pressed so that the knives cut the cap off. If the edge knife lies along a line axial of the drum holding it, this produces a vibrating effect which is undesirable. If the knife is spiral on the drum, it tends to move the frame axially of the drum so that added restraints are necessary to hold the frame against the knife. Further, this type of device also will cut the frame holding the comb so that care must be taken that the depth of cut is precise so as not to destroy the honey in the comb.

Transversely vibrating knives have also been used, but the same disadvantage of vibration, lateral movement of the frame and need for precise setting prevail.

By my invention I provide a device which avoids those disadvantages. There is little or no vibration; the arbors will not cut into the wood frame so that the depth of cut is set by the width of the edge of the frame, and the random positions of the cutting discs provide for a nullifying action towards lateral motion. All of these features make possible a two-arbor machine which can uncap both ends of the frame at the same operation.

## FIGURES

FIG. **1** is a top plan view of a machine embodying my invention,

FIG. **2** is a side elevational view of the machine,

FIG. **3** is a view to an enlarged scale of the operational part of one arbor removed from the machine,

FIG. **4** is a detailed view to an enlarged scale of a pressure adjustment device used to control the arbors, and

FIG. **5** is an elevational view of a holding cart for catching the cut off material and waste honey released during uncapping.

## DESCRIPTION

Briefly my invention comprises a machine having a transport device to carry honeycomb frames between two unique driven arbors. Each arbor includes a shaft having a plurality of canted discs adapted to engage and cut off the beeswax cap from the comb in the frame.

More specifically and referring to the drawings, my machine is mounted on a frame **10** having legs **11** to support it. A pair of endless belts or chains **12** carrying transverse flighting members **13** is carried by a pair of shafts **14** and is entrained over pulleys or sprockets **15** on the shaft.

Slides or guide rails **16** are provided on the frame. These slides are spaced apart laterally so that they will support the edges of a standard size frame as it slides longitudinally of the frame. The chains **12** also slide along these members as they are driven by a motor **17** through the shaft **14.** Thus, a frame placed on the slide **16** will be caught by a flighting member **13** and be carried from one end of the frame to the other.



About midway of the frame, I provide two unique driven arbors **18** positioned one above the other. Both arbors are similar, but they are mounted somewhat differently.

The lower arbor is permanently mounted on the framework **10** in a position to engage the lower surface of the honeycomb in its frame as it is carried along by the transport mechanism. The upper arbor is mounted in an adjustable mechanism including a pair of brackets **20.** Arms **21** are pivoted on the brackets **20** and in turn carry the arbor shaft **22** rotatably mounted thereon.

The weight of the arbor tends to carry this upper arbor downward towards the lower one so there is always a tendency for the arbors to come together. In order to limit this movement, I provide an adjustable stop **23** mounted on the arm **21** and adapted to engage the framework **10.** I also provide some adjustment of the pressure drawing the two arbors together. It has been my experience that the weight of the arbor provides more pressure than may be desirable, so I provide a compression spring **24** on a threaded spindle **25** engaged between the framework **10** and the arm **21** to provide a force counter to the weight of the arbor. The force of the spring **24** may be adjusted by adjusting the position of a stop nut **26** on the spindle **25.**

The arbor **18,** as best shown in FIG. **3,** is unique in its formation. Essentially it consists of a shaft **22** on which are mounted a series of discs **28.** These discs are not mounted perpendicularly to the axis of the shaft, but are canted relative thereto. The angle of cant may be similar, but the direction of the cant is varied so that there is no uniform spiral effect. This direction may be random or may be systematic so long as the point of maximum deviation measured on a given axial line and deviating from a perpendicular **29** varies from one side of the perpendicular to the other so that in a sense, the spiral action of at least some of the discs is opposite to that of others. By this construction, it may be ensured that there is no uniform force tending to move the comb frame in one direction, but instead, the forces on the comb frame will be in both lateral directions and therefore essentially nullified.

The outer surface of all the discs **28** is machined after mounting so as to be a part of a cylinder having the axis of the central shaft **22** as its axis. Thus, all points on the cutting surfaces are equidistant from the rotative axis and the cutting will be uniform. This machining is accomplished simply by mounting the discs **28** on the shaft **22** and then using the shaft **22** as a rotating center, either grinding the edges of the discs or otherwise machining those edges to provide the proper form.

In my device I have used separate motors **30** to drive the separate arbors **18.** It will be obvious that by proper gearing, or by belt and pulley, or chain and sprocket arrangements, a single motor could provide power not only for both main arbors **18** but also for the transport mechanism.

I also have illustrated a third arbor **18'** mounted on brackets **32** on the main framework **10.** This arbor might be used for manual trimming if desired. However, in my experience, I have found it to be unnecessary.

In use, a frame of honeycomb is placed on the slides **16** at one end of the machine (the right hand end in

FIGS. 1 and 2). It is then engaged by a flighting member 13 and is pulled to the left as the members 13 are carried by the chains 12 in that direction.

As the frame engages the outer surfaces of the discs 28 forming the arbors 18, the upper arbor is moved slightly upward but is positioned by the engagement of the end discs on each arbor with the wood on the frame. Because of the cylindrical form of the outer surface of the disc there is no cutting of the wood, but the discs do remove any beeswax extending beyond the wood frame. This effectively uncaps the cells of honey and as the comb frame moves between the arbors it can then be removed and placed in the extractor for further processing.

Because the beeswax and any waste honey which drops during the uncapping process may have value, I provide a portable cart including a hopper 34. This cart includes the hopper 34 mounted on wheels 35 and propelled manually through a handle 36. Posts 37 provide stability for the cart while it is standing.

I claim: cm 1. A honeycomb uncapping machine comprising a framework, transporting mechanism adapted to move a honeycomb frame on said framework, rotating arbor means on said framework carrying cutting means, said arbor means being positioned to engage opposite sides of said honeycomb frame, said cutting means including a plurality of canted disks adapted to engage the honeycomb frame.



2. The device of claim 1 in which the transport mechanism includes driven chains connected by flighting members, said flighting members being adapted to engage the honeycomb frame to move it on the framework.

3. The device of claim 1 in which said discs are canted such that the points of maximum deviation from the perpendicular are distributed around the circumference.

4. The device of claim 1 in which said discs have a cylindrical outer surface.

5. The device of claim 2 in which at least one of said arbors is movably mounted on said framework.

6. The device of claim 5 in which said movable mounting includes adjustable spring means engaged between said framework and said mounting to provide for an adjustable bias between said arbors.

7. An arbor for use in a honeycomb uncapping machine comprising a shaft, a plurality of discs mounted on said shaft, said discs being canted from a perpendicular to the axis of said shaft.

8. The device of claim 5 in which said canting is such that the deviation from perpendicular is such that direction of cant is opposite for some discs than for others.

9. The device of claim 6 in which the peripheral surface of said discs is of uniform cylindrical diameter.

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