ABSTRACT: Apparatus for shaping the base of an artichoke heart comprises a knife which approaches the base of the artichoke along the median axis of the artichoke and rotates about this axis. The knife extends axially until it penetrates the artichoke base but once it has penetrated the artichoke base its inclination with respect to the axis is progressively increased as it advances so that a conical shape is formed which diverges towards the tip of the artichoke. The outer portion of the lower part and top of the artichoke are subsequently removed.
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SHAPING ARTICHOKE HEARTS

The invention relates to the preparation of artichoke hearts and provides an automatic or semiautomatic machine for such preparation.

In machines currently in use, the formation of the artichoke hearts starts with stripping of the leaves which represents a serious disadvantage because, after a short period of operation of the machine, the members which perform this stripping become choked and it is necessary to provide for their clearing. In fact, the shaping of the base of the artichoke heart is effected by scraping or milling the outer parts which can be more or less easy in accordance with the freshness of the artichoke but is nevertheless always very difficult because of the presence of very resistant fibers in the sepals or leaves of the artichoke.

An object of the present invention is to shape the bases of artichoke hearts by means of members which penetrate into the stalk of the artichoke, thus eliminating the stripping of the leaves and the external scraping and/or milling, which has given up to now poor results with considerable inconvenience.

To attain this object, apparatus of the invention comprises clamping means for the terminal part or tip of the artichoke which serves to hold the artichoke in a stable position on the axis of the shaping device for the bottoms of the artichoke hearts, which device operates by penetration of knives into the flesh of the stalk.

Other objects of the invention, even if of minor importance compared with that set out above, will appear in the course of the following detailed description which is to be considered in conjunction with the accompanying drawings. In the drawings there are illustrated some embodiments of the invention, given by way of nonlimitative example. In the drawings:

FIG. 1 is a median vertical section through apparatus according to the invention;

FIG. 2 is a similar section to that in FIG. 1 in which the members which are subjected to rotation about the median vertical axis of the apparatus are rotated through a quarter of a turn;

FIG. 3 is a section similar to that in FIG. 2 showing the position of the members when they have performed the shaping of the base of the artichoke heart;

FIG. 4 is a plan view of the apparatus in the FIG. 3 position;

FIGS. 5 and 6 are similar sections to that in FIG. 3 showing two modified embodiments of the invention; and

FIG. 7 is a section similar to that of FIG. 3 with the apparatus operating in a horizontal plane and with artichoke clamping members slightly different from those illustrated in the preceding figures.

Like or equivalent parts are given the same reference numerals in all the figures.

Referring to the FIG. 1, the apparatus comprises a cylindrical sleeve 8 housing a composite cylinder 11, the lower part of which projects from the sleeve 8 and carries a pulley 12. The cylinder 11 has a flange 14 which bears on a ball bearing 15 provided in a suitable seat in the sleeve 8 and rotates in the rings 11' and 11" of the sleeve 8.

A flange 13' inside the sleeve 11 provides a guide seat for the movement of a plunger 16 which will be described below.

The cylinder 11 provides, outside the sleeve 8 and above the flanges 13' and 14, a cylindrical sleeve 13 provided at the top with a crosspiece 13', carrying in suitable seats turning knives 22,23 held together like scissor blades by means of a pin pivot 21 (FIG. 2). The knives 22,23 are extended into the sleeve 13 by two extensions 22',23' carrying at their lower extremity pins 26',27' for application of return springs 24,25 anchored at 26 and 27 to internal projections in the sleeve 13.

The extensions 22',23' of the knives 22,23 are slightly divergent and curved toward the base as shown in FIG. 2 and, are pressed into a spread apart position by the action of the end 16' of the plunger 16 as shown in FIG. 3, overcoming the action of the return springs 24,25.

The plunger 16 is displaced axially by a lever 9 acting on its lower end 16'. The movements of the plunger 16 inside the cylinder 11 are guided not only by the flange 13' but also by a collar 18 which constitutes a seat for the application of a cylindrical helical return spring 17.

The collar 18 is provided with a tooth 19 arranged to run in a slot 20 in the cylinder 11, which slot limits the axial displacement of the plunger 16 and ensures that it follows the rotary movements of the cylinder 11.

The lever 9 is pivoted at 10 to a movable part of the frame of the apparatus which, as will hereinafter be described, presses the sleeve 8 and the pivot 10 so that they approach the artichoke for work.

When an artichoke 28, confined between jaws 44, is transported by a rotary plate or a conveyor belt provided with an intermittent advancing motion arrives on the axis of the shaping apparatus (FIG. 2), the shaping of the bottom of the artichoke heart is effected inside the stalk (FIG. 3) as specified below and during intervals in the advance of the transport device.

The points of the knives 22,23 penetrate into the stalk 29 of the artichoke 28 during the progressive approach of the sleeve 8 and the pivot 10 towards the artichoke. The penetration is rotary because the pulley 12 maintains in constant rotation the cylinder 11,13 and all the parts of the apparatus secured thereto.

As soon as the penetration has started, the plunger 16 can be pushed progressively upwards by the lever 9 acting on its lower end 16 with its head 16' acting on the extensions 22',23' thus forcing the knives 22,23 to assume a progressively more divergent attitude. Thus, a progressive penetration of the points of the knives 22,23 into the stalk 29, there corresponds a progressive divergence of the knives themselves which will assume the position of maximum divergence and of maximum penetration (FIG. 3) at the end of the shaping step of the base of the artichoke heart.

Because the knives 22,23 are given a rotary motion around the median axis of the apparatus, they give the base of the artichoke heart a conical form diverging upwards which would otherwise have to be provided by stripping of the leaves and external scraping of the stalk 29.

The knives and the other members of the apparatus return from the FIG. 3 position to the FIG. 1 position by reverse movement of the members which have caused penetration of the points of the knives into the stalk and by the action of the return springs 17,24,25.

In order to liberate the base of the artichoke heart from the covering which encloses it, the knives 22,23 can be left divergent in the first stage of their removal from the shaped base or they can be directed, always in the said first stage, to place themselves with a blade in conjunction with the other (position of absolute maximum divergence) thus also enlarging the area of action of the points of the knives.

The top of the artichoke according to the line X—X of FIG. 3 can be treated in a manner known per se by means of a toothed milling cutter (not illustrated in the drawings) either while the artichoke is still on the axis of the device which has effected the shaping of the base of the heart 30 or in a successive step when the artichoke has been moved away from the axis by the transport members.

Referring to FIG. 5 the apparatus which functions substantially as that described above, has a modification constituted by two arms 34 and 37 which connect, by pivot pins 35,36,38, the extensions of the knives 22,23 to the head 16" of the plunger 16. With this pantograph connection between the knives 22,23 and the plunger 16 the return springs 24 and 25 are not necessary.

In FIG. 6 there is illustrated a simplification of FIG. 5 in that there is only one knife 22 having its extension 22' connected to the head 16" of the plunger 16 by means of an arm 31 and pivot pins 32 and 33.

In FIG. 7, the device of FIG. 3 is arranged to operate in a horizontal plane and the only differences are concerned with the members which support and clamp the artichoke. One of such members is constituted by a conical cap 44' against
which the artichoke is forced by feet 42 on arms 41 secured by pivot joints 40 to arms 39 connected to the sleeve 8 and following the displacements thereof. In this case, the arms 41, connected to the arms 39 by means of tension springs, act as pressure members to force the artichoke into the cap 44, and at the same time are also centering members for the artichoke because they force it into the axis of the shaping device.

Many modifications of the illustrated constructions are possible. For example, the artichoke can be lowered onto the knives and can be rotated instead of or as well as the knives; these modifications include the basic requirement of permitting shaping of the base inside the stalk.

I claim:

1. Apparatus for shaping the base of an artichoke heart comprising means for holding said artichoke, knife means for shaping the base of the artichoke heart, means for pivotally mounting said knife means for movement between a position generally in alignment with the median axis of said artichoke and a position diverging outwardly from said axis, means for providing relative rotation of said knife means and said holding means about said median axis, and means for moving said knife means axially relative to said housing means for adjusting the inclination of said knife means inside said artichoke, said knife means thereby forming in said artichoke base a cone diverging toward the tip of said base.

2. The apparatus of claim 1 wherein said knife means comprises a pair of knives pivotally interconnected so that their inclination to said median axis varies symmetrically.

3. The apparatus of claim 1 wherein said knife means includes an extension portion beyond said pivotal mounting, and further including an axially movable actuating member engaging said extension portion to move said knife means axially thereby to alter the inclination thereof.