March 3, 1936. T. W. W. FORREST 2,032,406

RAISIN TREATMENT METHOD AND APPARATUS

Filed June 23, 1933 2 Sheets-Sheet 1

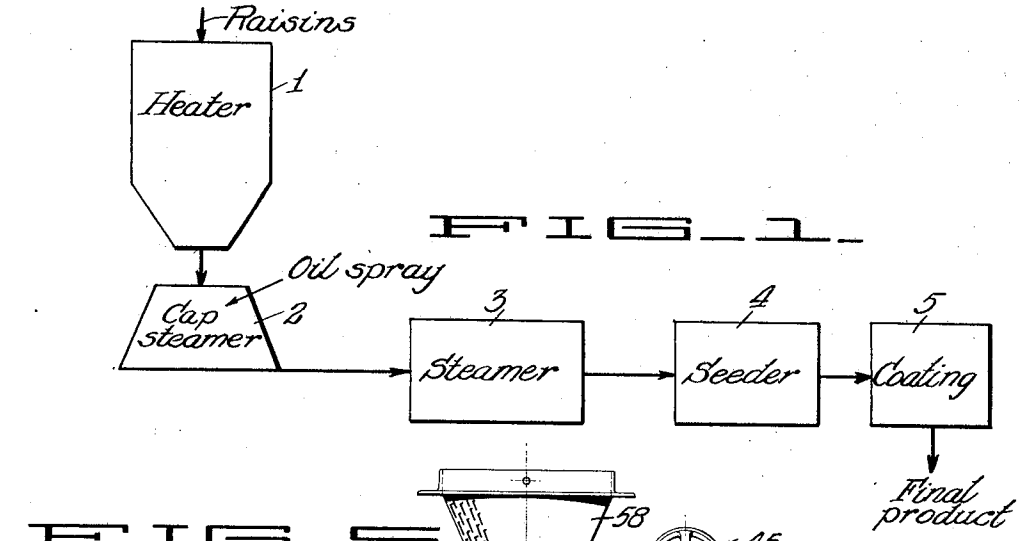


FIG_1_

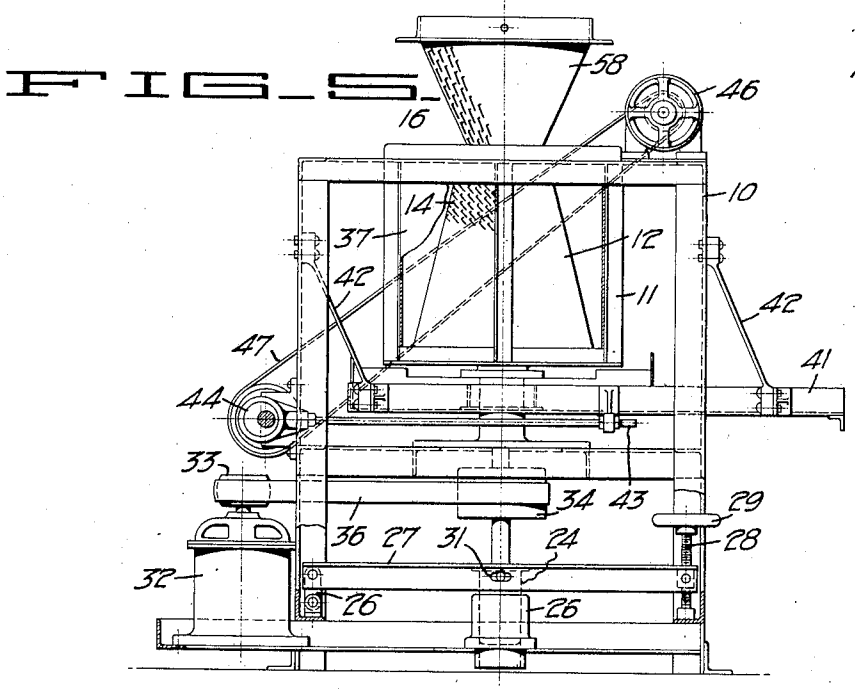
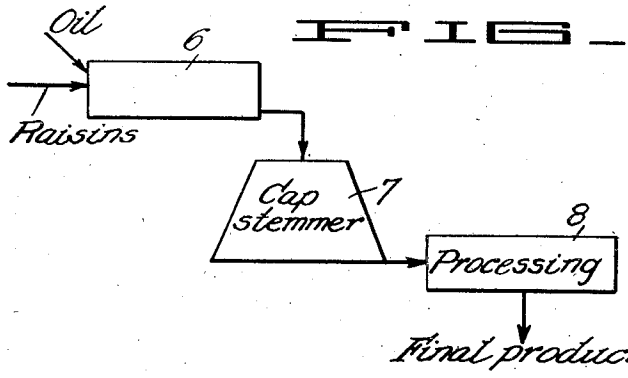


FIG_2_



INVENTOR
Thomas W. W. Forrest
BY
White, Prest, Flehr & Lothrop
ATTORNEYS.

March 3, 1936. T. W. W. FORREST 2,032,406

RAISIN TREATMENT METHOD AND APPARATUS

Filed June 23, 1933 2 Sheets-Sheet 2

FIG. 3.

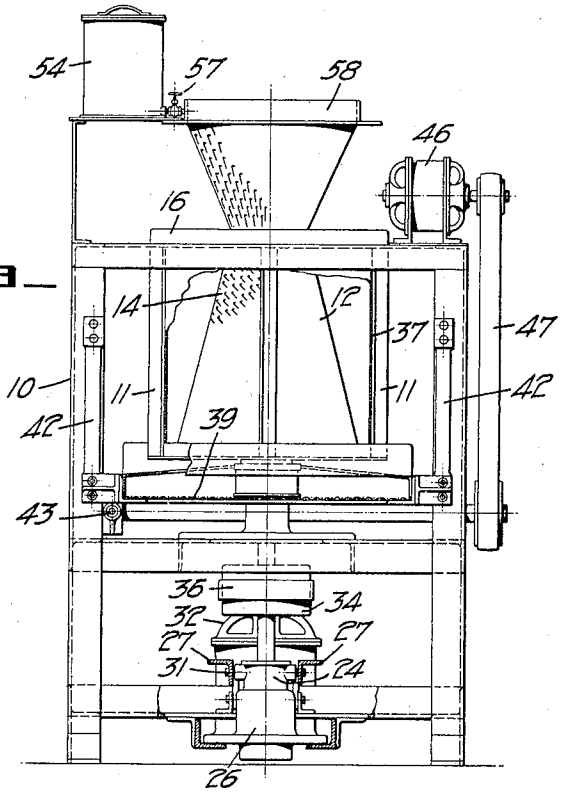
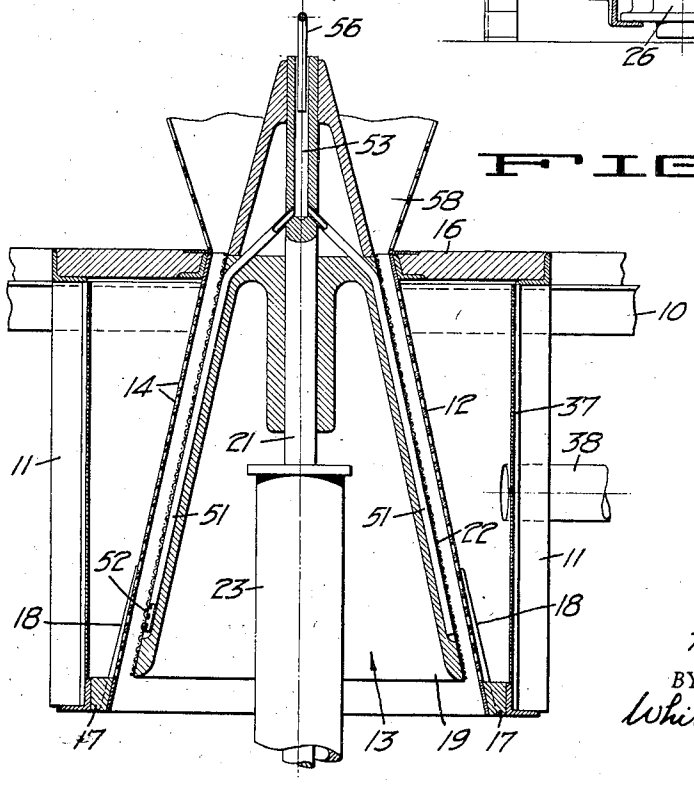


FIG. 4.



INVENTOR
Thomas W. W. Forrest
BY
White, Prest. Fleh & Lothrop
ATTORNEYS.

Patented Mar. 3, 1936 2,032,406

UNITED STATES PATENT OFFICE

2,032,406

RAISIN TREATMENT METHOD AND APPARATUS

Thomas W. W. Forrest, Fresno, Calif., assignor to Sun-Maid Raisin Growers of California, a corporation

Application June 23, 1933, Serial No. 677,267

4 Claims. (Cl. 146—55)

This invention relates generally to methods and apparatus for treatment of raisins, and is adapted particularly for use by the dried fruit industry where raisins are processed to place the same in marketable condition. The present application is a continuation in part of subject matter disclosed in copending application Serial No. 582,718 filed December 23, 1931.

The processing of raisins commonly includes a cap-stemming operation, which serves to remove the stems from the raisins by a mechanical action. In the past this cap-stemming operation has given considerable difficulty. The capacity of the cap-stemming machines has been definitely limited, mutilation of the skin of the raisins with resultant extrusion of juice is common, and the machines must be frequently shut down for cleaning and repair.

It is an object of the present invention to provide a raisin treatment method and apparatus which will afford a relatively efficient cap-stemming operation, without the difficulties which have been encountered in the past.

A further object of the invention is to improve on methods of the above character whereby the final product will be substantially free of skin mutilation, other than the mutilation which may be caused by seeding of the raisins.

Further objects of the invention will appear from the following description in which the preferred embodiments of the invention have been set forth in detail in conjunction with the accompanying drawings.

Referring to the drawings:

Figure 1 is a diagrammatic view illustrating the method of the present invention in the processing of raisins.

Fig. 2 is a diagrammatic view showing the manner in which my method can be applied to conventional cap-stemming apparatus.

Fig. 3 is an end view partly in cross section showing my preferred cap-stemming apparatus.

Fig. 4 is a cross sectional detail showing the construction of certain parts of the machine shown in Fig. 3.

Fig. 5 is a side elevational view of the machine shown in Figs. 3 and 4.

Referring first to Figs. 3, 4 and 5, the cap-stemmer illustrated consists of a main frame 10, which serves to support an inner sub-frame 11. Carried within the sub-frame 11, there is a stationary conical shaped part 12, and a rotatable conical shaped part 13. Part 12 is foraminous, in that it is formed of relatively thin sheet metal provided with inclined slots 14. The upper end of the stationary part 12 projects thru an opening provided in a platform 16, this platform being removably supported by the main frame 10. The lower end of the part 12 is held in proper axial alinement by ring 17, which is carried by the sub-frame 11. Likewise the lower portion of this part 12 is preferably corrugated, as indicated at 18, to secure more effective action upon the raisins as will be presently explained.

The inner rotatable part 13 of the cap-stemmer consists of a body 19 provided with a conical shaped peripheral surface, and mounted axially upon a rotatable vertical shaft 21. Fixed to and covering the outer conical periphery of body 19, there is a surfacing of metal screening 22. Note that the screening 22 is spaced with respect to the inner surface of the outer conical shaped part 12, to afford a space for passage of the raisins being treated.

As will be presently explained, it is desirable to permit vertical adjusting movement of the inner rotatable part 13 of the cap-stemmer. Such vertical movements are made possible by a special form of bearing for shaft 21. Thus within the body 19 of the rotatable part 13, shaft 21 is provided with a journal 23, in which shaft 21 can be vertically adjusted. Journal 23 is suitably supported by the main frame 10. The lower portion of shaft 21 is also journaled within a suitable thrust bearing block 24 which is vertically adjustable within a guide 26. Guide 26 is likewise secured to the main frame 10. Extending horizontally upon the opposite sides of the thrust block 24 are the levers 27, corresponding ends of which are secured to the frame 10 by links 26. The other corresponding ends of levers 27 are connected to a common cross-head which is provided with a nut threaded upon a screw 28. Screw 28 is mounted upon frame 10 and can be turned to any desired adjusted position by the hand wheel 29. Pin and slot connection 31 connects the intermediate portions of levers 27 with the bearing block 24. By turning hand wheel 29 thrust bearing block 24 and thus shaft 21 can be adjusted vertically within certain limits.

As representative of suitable means for driving shaft 21 at a relatively high rate of speed, as for example about 1200 R. P. M., there is shown an electric motor 32, mounted upon frame 10 and provided with a drive pulley 33. Pulley 33 is connected to a pulley 34 fixed to shaft 24 by a belt drive 36.

In order to tend to retard the downward rate of flow of raisins to the cap-stemmer, I preferably cause a draft of air to flow upwardly between

the outer and inner parts 12 and 13. This can be accomplished by enclosing the sides of subframe 11 with walls 37. A stream of air is introduced into this enclosure, as by means of conduit 38. This air flows thru the slots in part 12 and is delivered upwardly thru platform 16. Such an air draft not only retards the rate of the raisins to the cap-stemmer, but may also tend to aid in effecting cooling of the raisins, in the event the raisins have been heated in a prior step of the processing.

Immediately below the conical part 12, a horizontal screen 39 is provided for receiving the raisins, this screen being supported by a suitable frame 41. Frame 41 is supported by resilient members 42 and is adapted to be vibrated by suitable means, such as an an excentric rod 43 and excentric 44. Excentric 44 is shown driven by an electric motor 46, thru the belt drive 47. Screen 39 is of such a mesh that it will pass the stems, and is so arranged that when vibrated the raisins are continuously moved toward one side of frame 10 where they are discharged.

In addition to the parts of the cap-stemmer described above, I provide means for introducing a spray of oil into the space between the parts 12 and 13. Thus as shown in Fig. 4 the conical shaped body 19 is recessed to accommodate longitudinal tubes 51, which are provided with apertures 52 for the discharge of oil thru screening 22. At their upper ends, tubes 51 are connected to a passage 53 formed axially of shaft 21. As representative of suitable means for introducing a controlled quantity of oil in passageway 53 there is shown a reservoir 54 mounted upon a suitable support, and the pipe 56 leading from the lower portion of this reservoir discharges into the passageway 53. The rate of flow of oil can be controlled by valve 57. Oil introduced from reservoir 54 is discharged by centrifugal force thru apertures 52 and by virtue of its velocity and also by virtue of the fact that the oil must pass thru screen 22, a finely atomized mist or spray is provided for effectively securing the results to be presently described.

Operation of the machine described above, and the carrying out of certain phases of the present method, is as follows:—As the raisins to be treated flow into the machine from hopper 58 they are caught up and swirled about in the space between the stationary conical part 12, and the rotary screen 22. Repeated impact of the raisins upon the inner surface of the stationary part 12, and the surface of the rotary screen 27, which is accompanied by rolling or turning movement of the raisins, causes the stems of the raisins to be removed. The raisins, together with the removed stems, gradually progress downwardly until they are received upon the shaker screen 39. A final abrasion is effected by the lower corrugated portion of part 12, which tends to reduce the velocity of the raisins. The removed stems including those discharged thru slots 14, pass thru screen 39, while the stemmed raisins are delivered from the end of the screen. The vertical position of the rotary part 13 should of course be adjusted to secure proper cap-stemming of the particular character of raisins being handled.

While the raisins are passing down thru the space between the inner rotating screen 22, and the outer stationary part 12, this space also continues to receive a small quantity of atomized oil, being discharged from the apertures 52. The continual supply of this oil has a marked effect upon operation of the machine, and upon the cap-stemming operation. A certain amount of this oil adheres to the raisins, and also a certain amount of the oil serves to maintain a thin oil film upon the surfaces of screen 22 and stationary part 12, which are contacted by the raisins during their passage thru the machine. It has been found that this makes possible operation of the machine at higher speed, and at a far greater capacity, compared to the speed of operation and capacity which would be permissible without such introduction of oil. At the same time, and even at the greatly increased capacity, it has been found that the skins of the raisins are not mutilated, although the stems are still effectively removed. Furthermore, the machine, by virtue of the use of oil in the manner described, is made substantially self-cleaning. This is due not only to the fact that mutilation of the skins of the raisins is minimized, but also to the fact that the stems or other material removed from the raisins during the cap-stemming operation would not tend to adhere to the surfaces provided with an oil film, to clog the inclined slots 14.

The non-clogging feature of my cap-stemmer is also due in part to the use of a relatively thin metal for the part 12, in place of a wire screen, and to the fact that the slots 14 in this thin sheet metal are inclined in the direction of rotation of the inner part 13. However, the use of relatively thin metal would not be practical if it were not for the fact that the use of oil in the manner described minimized wear upon this part, thus making possible a long useful life without frequent repairs.

In Fig. 1, I have shown the several steps of a complete processing method incorporating the cap-stemmer described above, together with the heater shown and claimed in the aforesaid application Ser. No. 582,718. In this method the raising are first passed thru a heater 1, where they are subjected for a short time to a relatively high temperature. Following removal from this heater the raisins are cooled and then introduced into the cap-stemmer 2. From the cap-stemmer 2 the raisins are treated in a steamer 3, from which they are delivered to the seeder 4. The seeded raisins can then be contacted with a suitable coating solution as indicated at 5, to produce the final marketable product. In this Fig. 1, cap-stemmer 2 is intended to represent a cap-stemmer substantially in accordance with that previously described with reference to Figs. 3 to 5 inclusive. The amount of oil introduced into this cap-stemmer should preferably be maintained at a minimum, to secure the desired results. While it has been found that a relatively small amount of oil is required to secure the desired results, a certain amount of this oil will remain upon the raisins received by the steamer 3. However during the steaming process traces of this oil which may remain from the cap-stemming operation are effectively removed, so that no oil of this character appears upon the final product. This is desirable because the oil introduced into the cap-stemmer is usually a mineral oil, such as white oil, and material of this character upon the final product is objectionable.

While we have found it desirable to introduce oil directly into the cap-stemmer, it is also possible to secure good results by contacting the raisins with a small amount of oil, before the raisins are delivered to a conventional mechanical cap-stemmer. Thus as shown diagrammatically in Fig. 2, the raisins are shown being introduced into a tumbler 6, where they are subjected to a

spray of oil. From this tumbler the raisins are delivered to the mechanical cap-stemmer 7. The oil thus carried into the mechanical cap-stemmer will serve to maintain a thin film of oil upon the surfaces with which the raisins are contacted to effect cap-stemming. Therefore this cap-stemmer can likewise be operated at a relatively high capacity, with a minimum amount of mutilation to the skin, and with a greatly reduced tendency towards clogging. From the cap-stemmer 7, the raisins are shown being delivered to the processing steps 8, to form the final product.

I claim:

1. In a method of treating raisins, the steps of subjecting the raisins to repeated impact between relatively moving surfaces, thereby removing stems from the same, maintaining a film of oil upon said surfaces, and subsequently removing any oil adhering to the raisins by steaming.

2. In apparatus of the character described for cap-stemming raisins, a conical part having a roughened outer peripheral surface, a rotatable shaft upon which said shaft is axially mounted, an outer conical shaped member surrounding said first named member and likewise having a roughened inner peripheral surface, said peripheral surface of said members spaced apart in a radial direction, means for passing raisins downwardly between said members, and means for centrifugally spraying oil from the inner rotatable part into the space between said parts.

3. In apparatus of the character described for cap-stemming raisins, inner and outer nested parts, the inner part including a conical shaped screen, means for effecting rotation of the inner part about its axis, the outer part being likewise conical shaped and having thin sheet metal walls spaced radially with respect to the outer periphery of the inner part, and means for causing raisins to pass downwardly between said parts to effect mechanical removal of the stems therefrom, the sheet metal walls of the outer part having slots, substantially all of said slots being inclined at a substantial angle with respect to the axis of the inner part.

4. In a method of treating raisins, the steps of subjecting the raisins to repeated impact between relatively moving surfaces to effect removal of stems therefrom, and maintaining a film of oil upon said surfaces.

THOMAS W. W. FORREST.