Oct. 31, 1961 C. W. STEPHENSON ET AL 3,006,764

TEA BAG

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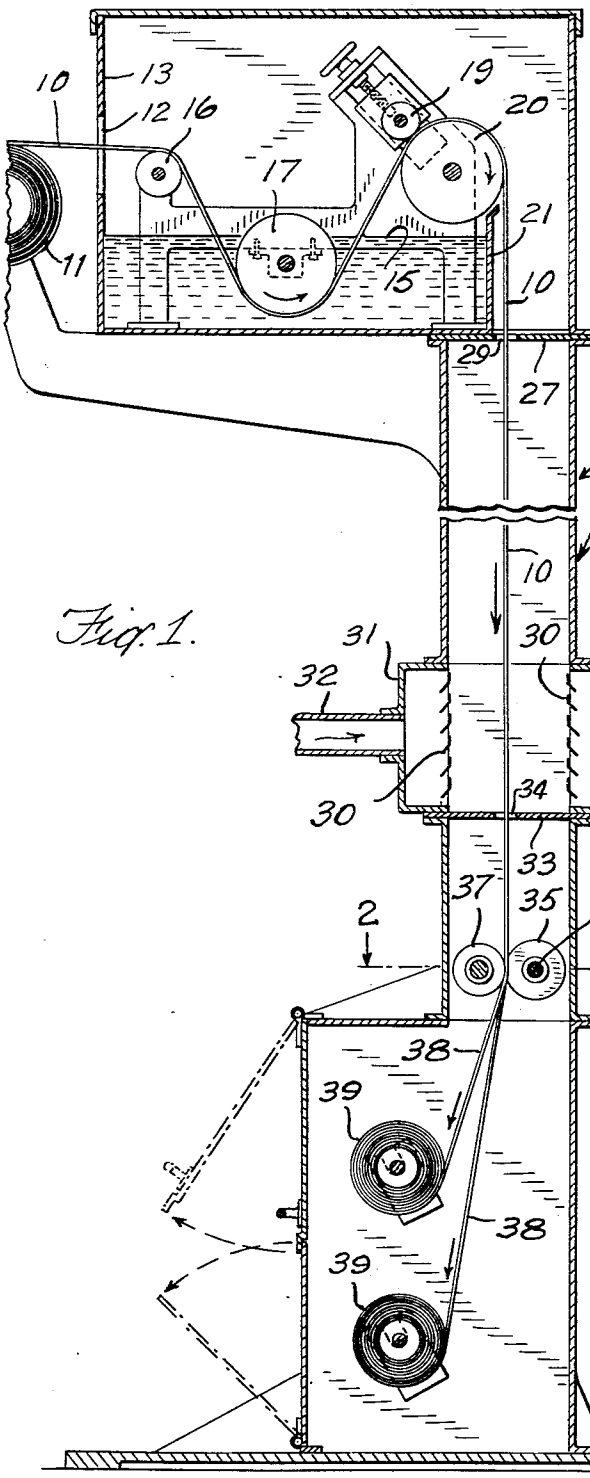

Fig. 1.

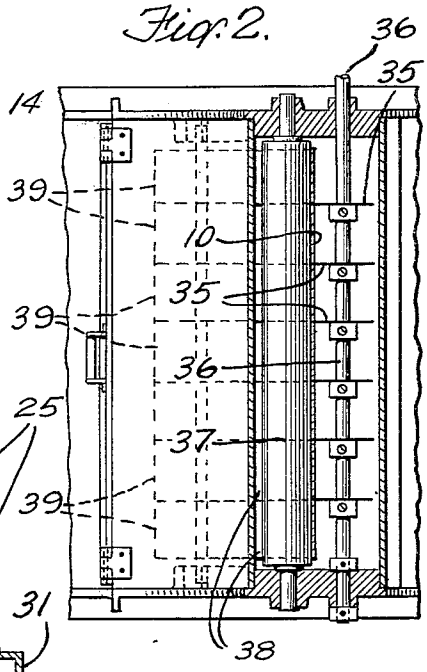

Fig. 2.

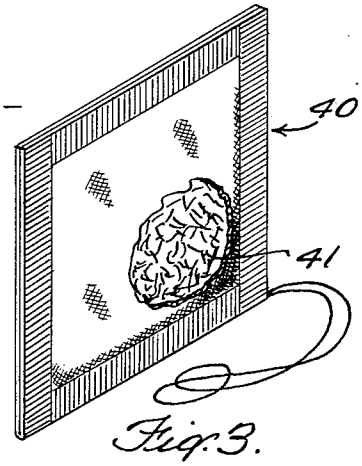

Fig. 3.

INVENTORS
CLAY W. STEPHENSON
NORMAN D. VANHORN
BY
ATTORNEY

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Clay W. Stephenson, Houston, Tex., and Norman D. Van Horn, Haddon Heights, N.J., assignors, by mesne assignments, to Duncan Coffee Company, Houston, Tex., a corporation of Texas

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This invention relates to a self-sweetening tea bag and to a method of making the same.

An object is to provide a tea bag having novel and improved characteristics.

Another object is to provide a tea bag having a soluble sweetening material incorporated therein in a manner to be dissolved with the tea in the presence of water.

Another object is to provide a tea bag with a sweetening composition so arranged and constructed that the sweetening agent becomes uniformly dispersed in the tea without stirring.

Other objects and advantages will be apparent as the nature of the invention is more fully disclosed.

In accordance with the present invention the sweetening agent is incorporated in the paper prior to the making of the bag. The agent may be incorporated in the pulp prior to or during the making of the paper or may be applied to the paper in web or sheet form by dipping and drying under conditions to provide the desired concentration of sweetening agent in each bag.

As a specific example, a mixture of cyclamate and saccharin may be used for the treatment. The mixture is made into the form of a dilute solution in which the paper pulp may be immersed prior to application to the cylinder of a Fourdrinier machine where it is made into web form and dried. Alternatively, the paper web may be dipped in the solution of sweetening agent and dried in a suitable oven through which it is passed.

It has been found that a concentration of about from 40 to 82 mg. of sweetening agent in each finished tea bag produces a satisfactory amount of sweetening.

One method of carrying out the invention is illustrated in the drawing in which

FIG. 1 is a vertical section through an apparatus for dipping and drying the web;

FIG. 2 is a horizontal section taken on the line 2—2 of FIG. 1; and

FIG. 3 is a broken perspective view of a tea bag embodying the invention.

Referring to the drawing more in detail a web **10** of tea bag paper of the usual type, and preferably treated with a heat sealing composition, is fed from a roll **11** which may be of a width suited to be slit into a plurality of tea bag strips.

The web **10** passes through a slit **12** in the wall **13** of a tank **14** containing a bath **15** of the sweetening agent. The web **10** passes downwardly around a roll **16** into the bath **15** thence around a roll **17** and between a pair of squeeze rolls **19** and **20**. The roll **19** may be adjustable to control the pressure on the web and thereby maintain a controlled, uniform pick-up of the sweetening agent.

From the rolls **19** and **20** the web passes over a wall **21** into a drying tunnel **25** shown as extending vertically downward. The tunnel **25** is provided with an upper transverse wall **27** having a slit **29** for the passage of the treated web and near its lower end is provided with louvers **30** communicating with manifolds **31** leading by pipes **32** to sources of hot dry air. The hot air passes upwardly in the tunnel **25** around the web **10** for drying the web and leaving the sweetening agent in solid or powder form absorbed onto the fibers of the paper and bonded thereto.

The web **10** after leaving the drying zone passes through a slit **34** in a lower transverse wall **33** into a cooling zone which may consist of a span exposed to air at atmospheric temperature or cool air may be blown against the web. Thence the web passes into a slitting zone comprising a plurality of rotating knives **35** mounted on a shaft **36** and contacting a backing roll **37**. The knives **35** slit the web **10** into strips **38** of tea bag width which are individually rolled onto spools **39** and are of a size adapted to be fed to a tea bag machine of standard type which is adapted to cut, fold, fill and heat seal the bags and to discharge the same as individual tea bags **40** which are impregnated with a sweetening powder **41** as indicated in FIG. 3.

The concentration of the sweetening agent in the paper should be such that the agent in one tea bag furnishes the desired sweetening for the tea to be made therefrom. However, the amount of impregnant should not be such as to interfere with the heat sealing of the bag. It has been found that a concentration of dry powder of from 0.5 to 1.0 gram per square foot of paper is generally satisfactory and does not interfere with the heat sealing of the bag. Such a pick-up may be obtained from a bath containing from 1.1 pounds to 3.3 pounds of sweetening agent per gallon of water. This pick-up amounts to about 40 to 82 milligrams of powder per bag for the usual size of bag intended for making a cup of tea. About 12.2 such bags are normally made from one square foot of tea bag paper.

The degree of sweetening may be varied by using a mixture of sodium cyclamate and saccharin in selected proportions. The saccharin has a greater sweetening effect than the sodium cyclamate. Hence by increasing the ratio of saccharin to sodium cyclamate the sweetening effect is increased and vice versa without increasing the total amount of sweetening agent. For usual purposes the mixture may contain from 5% to 25% of saccharin, depending upon the results desired.

As an example the bath **16** may consist of 1.5 pounds sodium cyclamate and 0.15 pound saccharin per gallon of water. This concentration would result in a pick-up of about .85 gram per square foot of paper on a dry basis which amounts to 70 mg. per tea bag.

The pick-up is dependent upon the concentration of the bath but little affected by variations in time of treatment provided there is sufficient time for the paper to become saturated. A few seconds is usually sufficient. The bath may be maintained from room temperature to about 150° F. to prevent precipitation of the sweetening agent.

In the drying tunnel the air may be introduced at a temperature of 200° F. to 350° F. At the higher temperature the web must advance at a rate to prevent scorching of the paper or degradation of the sweetening agent. Cooling prior to spooling is preferable if the rolls are to be used promptly. Otherwise a considerable time would be required for the interior of the roll to reach room temperature.

This invention is particularly adapted for use in tea bags, obviously it is not restricted to this use and may be applied to other food packages which are used in the same manner.

What is claimed is:

1. A tea bag comprising a sealed paper bag containing tea, said paper being water pervious and being impregnated with a mixture consisting essentially of sodium cyclamate and saccharin in an amount of about 40 to 82 milligrams, the saccharin in said mixture constituting from 5% to 25% thereof.

2. A tea bag comprising a sealed paper bag containing tea, said paper being water pervious and being impregnated with a mixture consisting essentially of sodium cyclamate and saccharin in an amount of about 70 milli-

grams, the saccharin in said mixture constituting from 5% to 25% thereof.

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