

(12) UK Patent Application (19) GB (11) 2 046 085 A

- (21) Application No 8000509
(22) Date of filing 8 Jan 1980
(30) Priority data
(31) 12523U
(32) 15 Feb 1979
(33) United States of America (US)
(43) Application published 12 Nov 1980
(51) INT CL³
A47J 37/12 B01D 37/00
(52) Domestic classification
A4D 7
B1D 1107 1301 1504
1603 1610 1819 1909
2204 2302 2308 AK
(56) Documents cited
GB 1302117
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(58) Field of search
A4D
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(54) Filtering contaminants from a frying etc. fluid

(57) In a deep frying cooking process, the cooking takes place within the confines of a filter element 40 immersed in the cooking oil or grease in a receptacle 2 and the filter element continually filters the fluid medium to trap contaminants suspended therein,

owing to the turbulence imparted to the fluid by the application of heat. The apparatus includes a straining basket 80 located within the element 40. The said element is typically formed as a bag but may exclude integral stiffening portions to allow it to stand upright instead of being supported by the rim of the receptacle 20.

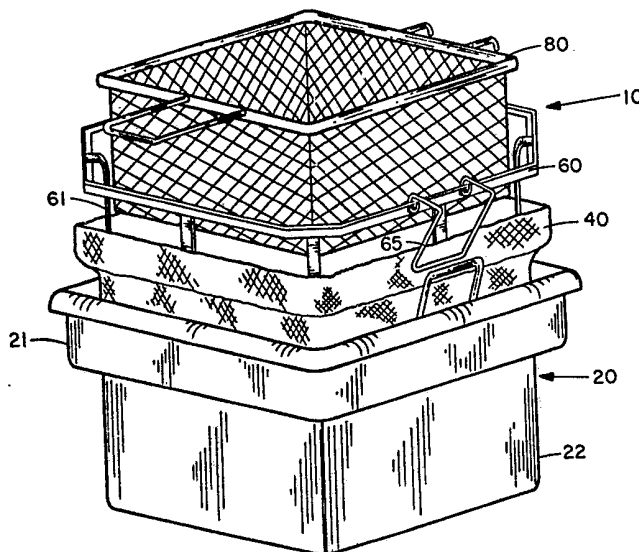


Fig. 1

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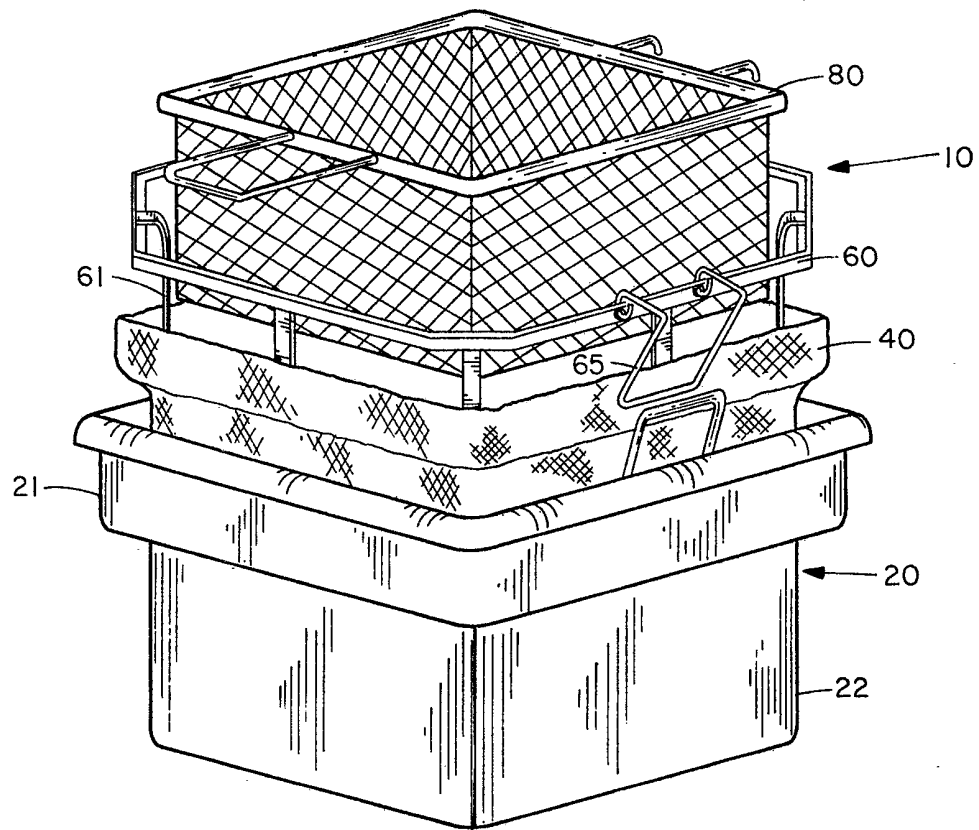


Fig. 1

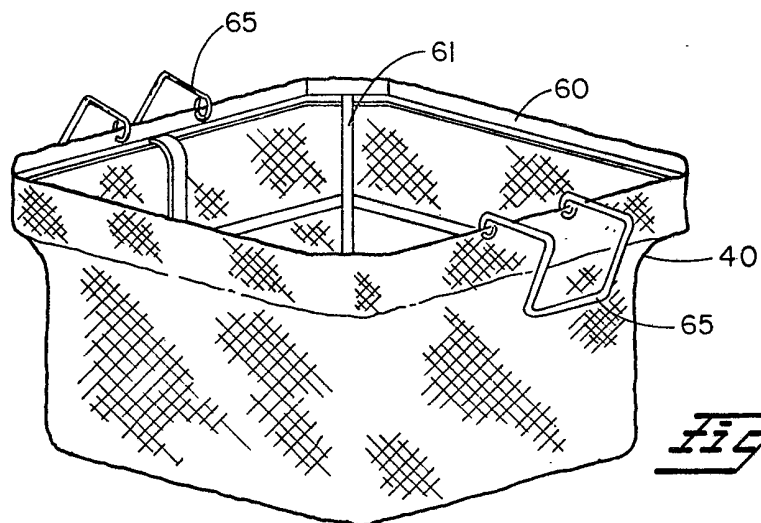
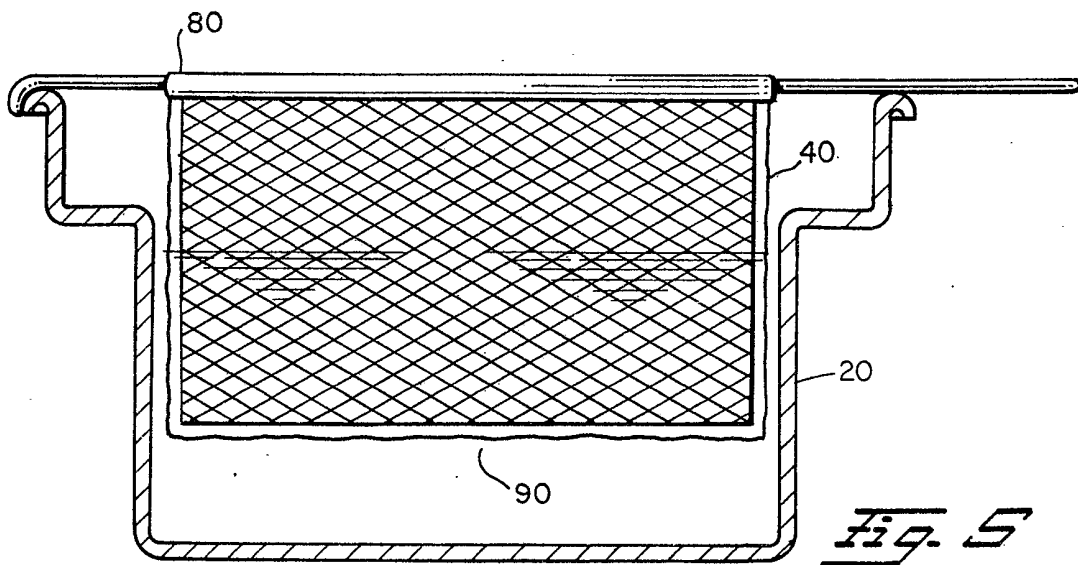
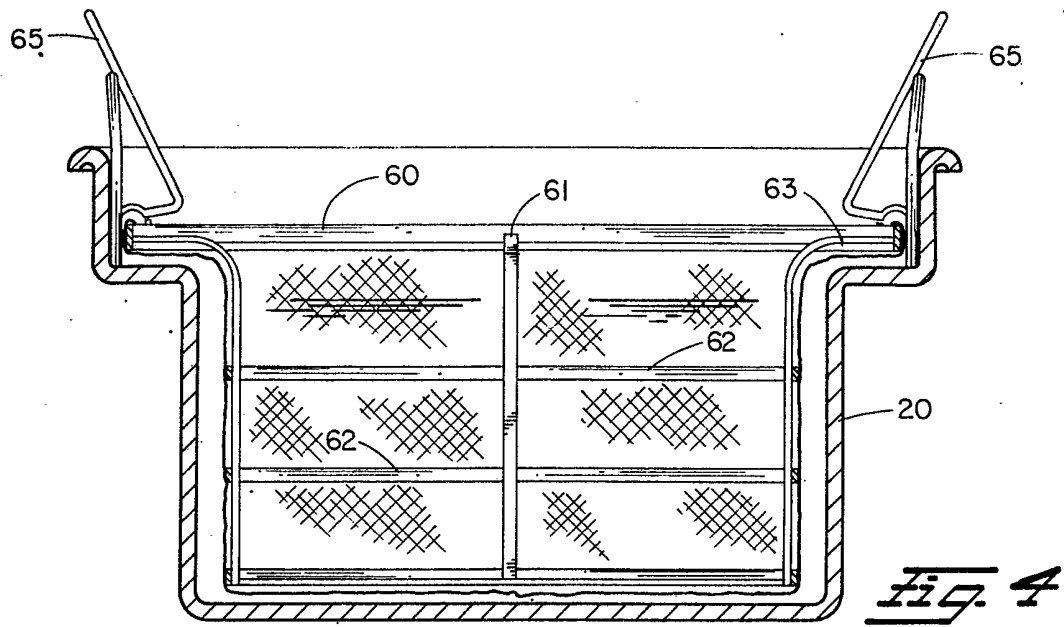
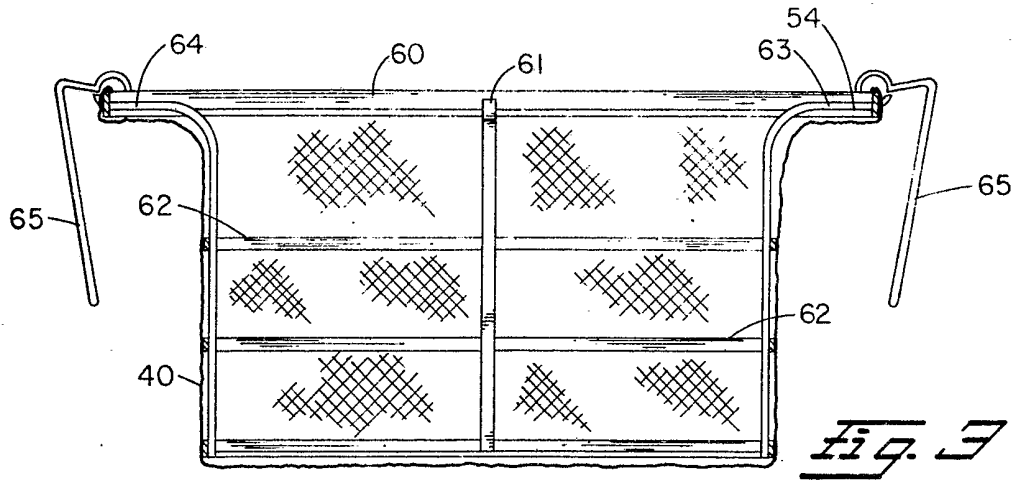


Fig. 2



SPECIFICATION

Filtering contaminants from a fluid

This invention relates to a method and apparatus for filtering contaminants from a fluid.

5 In both domestic and commercial deep frying cooking processes, large quantities of cooking oil or grease are consumed. During the cooking process the oil or grease becomes contaminated with water, fatty acids, dirt, carbon particles, food
10 particles and other undesirable elements. Since the normal cooking temperatures employed in a deep frying process range from 325° Fahrenheit and above, the presence of contaminants in the oil cause it to smoke, turn black and chemically break
15 down into its constituents.

One of the ways that large commercial establishments have sought to avoid this problem has been to periodically circulate the cooking oil through a complex filtration system, which is
20 expensive to install and maintain.

Domestic users and commercial establishments which do not employ the circulating filtration system are faced with no other alternative than to pour the contaminated grease or oil through a
25 cloth or fabric material or to dispose of the contaminated oil or grease all together and replace it with a fresh supply. The disposal of the cooking fluid is very expensive, due to the cost per volume of cooking oil and grease and the amounts
30 required. The pouring of the fluid through a filter material is also a messy and sometimes hazardous task due to the temperature of the fluid, its weight and volume and the slippery characteristics it imparts to surfaces with which it has come into
35 contact.

An object of the present invention is to provide an inexpensive, safe, easy to use filtration system which will substantially reduce the amount of cooking fluid consumed in both domestic and
40 commercial deep frying operations.

Another object is the provision of a filtration system which does not require a complex circulation system to filter the cooking fluid, and which can be adapted for use in standard deep
45 frying containers with little or no modifications required.

According to one aspect of the present invention I provide a method of filtering contaminants from a fluid to which heat is applied
50 to cook material immersed therein; comprising the steps of:

placing a volume of fluid in a receptacle;
supporting a bag shaped filter in the receptacle with the open end of the bag extending above the
55 level of the fluid;
inserting uncooked material into the interior of the bag shaped filter; and
applying heat to the receptacle to heat the fluid to cook the material and create turbulence in the
60 fluid to circulate the fluid continuously through the filter to trap contaminants suspended thereon.

According to another aspect of the invention I provide a filter apparatus for use in a fluid-containing receptacle to which heat is applied to

65 cook material in said fluid comprising an open-ended bag shaped filter for insertion in said receptacle; and support means to maintain the open end of the filter above the level of fluid in the receptacle.

70 The method and apparatus of the invention involve the use of a filtration system which promotes flow through the filter in one direction upon insertion into the cooking fluid, flow through the filter in the opposite direction upon removal
75 from cooking fluid and flow in both directions during the cooking process.

Referring to the accompanying drawings:—

Figure 1 is an exploded perspective view of one embodiment of the invention showing the nesting
80 relationship of the elements which are employed in practicing the invention;

Figure 2 is a perspective view of the filter and support frame of Figure 1 in the assembled relationship;

85 Figure 3 is a cross sectional view of the filter and support frame taken through line 3—3 of Figure 2;

Figure 4 is a cross section view of the filter in use prior to withdrawal from the fluid reservoir;
90 and

Figure 5 is a cross sectional view of a modified version of the preferred embodiment showing the cooperation of the basket strainer frame handle and hook, and the flanged shoulder of the fluid reservoir to suspend the filter in the drain position.

In the drawings, like reference numerals designate identical or corresponding parts throughout the several views, Figure 1 shows the cooking and filtration system of the instant
100 invention designated generally as 10. The elements which comprise the system include a fluid reservoir or receptacle 20, a filter element 40, a support frame 60 and a straining basket 80.

The fluid reservoir 20 is preferably fabricated
105 from stainless steel and has a flanged outwardly depending shoulder portion 21 surrounding the downwardly depending reservoir portion 22.

The support frame 60 comprises a plurality of vertical 61 and horizontal 62 frame members which form an open basket structure which conforms to the interior configuration of the reservoir portion 22 of the fluid reservoir 20. The vertical frame members 61 are curved outwardly at their uppermost ends (as at 63) to form an outwardly depending lip 64 around the upper periphery of the support frame 60. The support frame 60 is also provided with a plurality of pivoted handles 65 whose purpose and function will be explained further on.

120 Releasably secured to the periphery of the support frame 60 is a filter 40 in the form of an open-ended bag or envelope. The filtration 40 is secured to the outwardly lip 64 of the support frame in any suitable manner, such as by clips, springs, draw strings, prongs, stays, stiffening members etc.

The filter 40 of the preferred embodiment is mounted on the exterior of the support frame, and can be fabricated as a non-woven resin-bonded

fabric composed of rayon fibres and binders which is manufactured by Kendall under the numerical designation 143—038 and which complies with the Food and Drug Administration regulations regarding filtration of hot edible oils and fats; however, any filter material which possesses the same or similar properties as the Kendall filter whether woven or non-woven would be a suitable substitute.

The filtration system is operated as follows: prior to cooking foodstuffs, the fluid reservoir 20 is filled with cooking oil or melted animal fat, the filter 40 is releasably secured to the support frame 60 and the combined support frame and filter are lowered via handles 65 into the fluid reservoir, which results in the fluid 90 being forced in one of two directions through the filter material. The downward travel of the combined support and filter into the reservoir terminates when the outwardly depending lip 64 around the upper periphery of the support frame 60 contacts the flanged shoulder portion 21 of the fluid reservoir. In this position the support frame suspends the filter in close proximity and adjacent to the interior walls of the reservoir. The foodstuffs or items to be cooked are then inserted into the interior of the bag shaped filter, and heat is applied to the receptacle to heat the fluid to cook the material contained within the confines of the filter. The turbulence created by the application of heat to the fluid forces the fluid in both directions through the filter material, and when the filter is removed from the reservoir the fluid is forced in the other of two directions through the filter material.

The advantages of this method and apparatus should by now be obvious, since the initial insertion of the filter into the reservoir performs a preliminary filtration of any contaminants present in a substantial proportion of the reservoir's fluid volume, and when the food stuff is placed within the internal confines of the filter and heat is applied to accomplish the cooking process, fluid turbulence is an inherent by-product which forces the contaminated oil or grease repeatedly through the filter, so that oil which passes from within the confines of the filter and support, is filtered once on egress and again on ingress. This circulating filtration continues for the duration of the individual cooking cycle and for succeeding cycles until the filter has to be replaced; whereupon, the removal of the filter and support forces the fluid by gravity in the other of two directions through the filter for the final time to trap any contaminants which might have remained suspended within the confines of the interior of the filter during its useful life.

As can be seen by reference to Figure 5, the pivoting handles 65 of the support frame are designed to cooperate with the flanged shoulder 21 of the fluid reservoir to suspend the frame and filter above the reservoir portion to allow drainage of residual fluid from within the confines of the filter. When this has been accomplished, the filter is removed and disposed of and a new filter is secured to the support frame and the method is

repeated.

Positioning the filter on the exterior of the support frame facilitates removal of the used filter through the releasable securing means and allows any residual fluid remaining on the support frame to be deposited on the interior of the new filter as it is being placed on the support.

In addition to the modification shown in Figure 5 the modifications are, of course, possible. The need for a specially designed support frame can be obviated and in one version the filter is releasably secured directly to the exterior of a standard straining basket normally used to suspend foodstuffs in the cooking fluid during cooking. In another version the filter has integral stiffening portions which allow it to stand upright in the fluid reservoir by itself and in still another version the filter 40 is releasably secured to the fluid reservoir 20.

In all these embodiments the food is cooked within the confines of the filter element, and the inherent fluid turbulence created by the application of heat continuously circulates the fluid through the filter to trap contaminants therein.

CLAIMS

1. A method of filtering contaminants from a fluid to which heat is applied to cook material immersed therein; comprising the steps of:
 - placing a volume of fluid in a receptacle;
 - supporting a bag shaped filter in the receptacle with the open end of the bag extending above the level of the fluid;
 - inserting uncooked material into the interior of the bag shaped filter; and
 - applying heat to the receptacle to heat the fluid to cook the material and create turbulence in the fluid to circulate the fluid continuously through the filter to trap contaminants suspended thereon.
2. A method of filtering contaminants from a fluid as in Claim 1 further comprising the steps of,
 - removing the cooked material from the filter;
 - raising the entire filter above the level of the fluid to allow the fluid and contaminants within the interior of the filter to drain through the filter via gravity into the receptacle; and
 - disposing of the used filter.

3. A method of filtering contaminants from a fluid substantially as herein described.

4. A filter apparatus for use in a fluid-containing receptacle to which heat is applied to cook material in said fluid comprising an open-ended bag shaped filter for insertion in said receptacle; and support means to maintain the open end of the filter above the level of fluid in the receptacle.

5. A filter apparatus according to Claim 4, wherein, said filter is removably secured to said support means.

6. A filter apparatus according to Claim 5 wherein, said filter is removably secured to the exterior of said support means.

7. A filter apparatus according to Claim 6 wherein, said support means is positioned inside the bag shaped filter.

8. A filter apparatus according to Claim 4 or 5,
wherein said support means is formed by said fluid
filled receptacle.

5 9. A filter apparatus according to Claim 4
wherein, said support means forms an integral

part of the filter.

10. An improved filter substantially as herein
described with reference to and as shown in the
accompanying drawings.

Printed for Her Majesty's Stationary Office by the Courier Press, Leamington Spa, 1980. Published by the Patent Office,
25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.