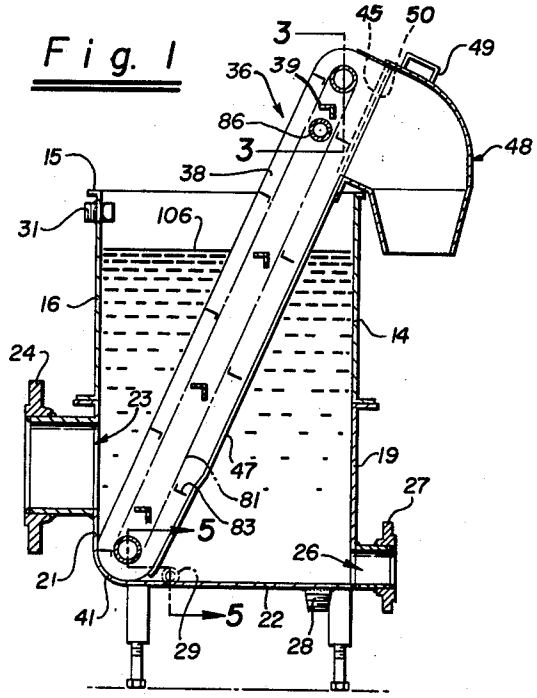
Dec. 1, 1964 C. K. BENSON 3,159,574

CATCH BOX

Filed Jan. 23, 1961 2 Sheets-Sheet 1

Fig. 1



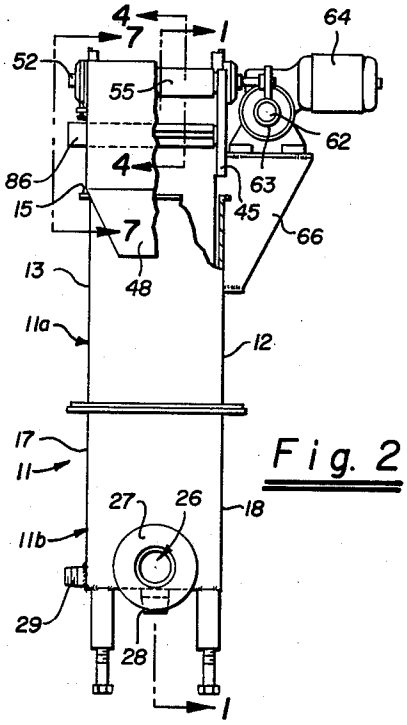




Fig. 2

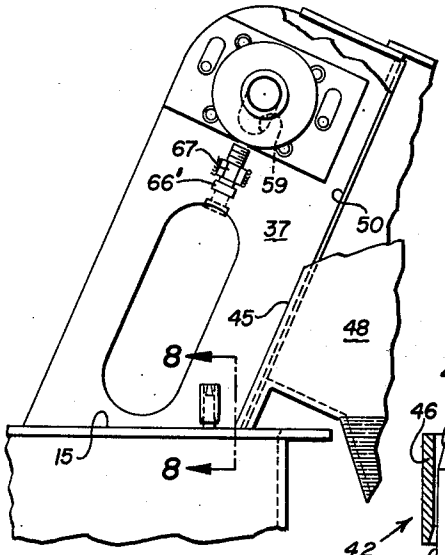



Fig. 7

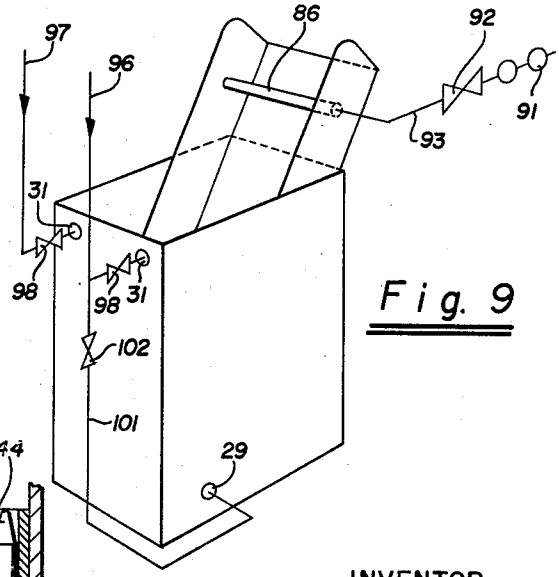



Fig. 9

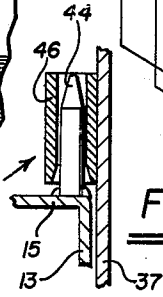



Fig. 8

INVENTOR
Clark K. Benson
By Fleh & Swain
ATTORNEYS

Dec. 1, 1964 C. K. BENSON 3,159,574

CATCH BOX

Filed Jan. 23, 1961 2 Sheets-Sheet 2

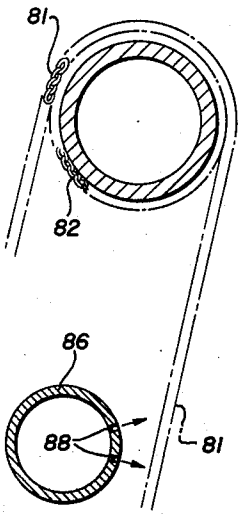



Fig. 4

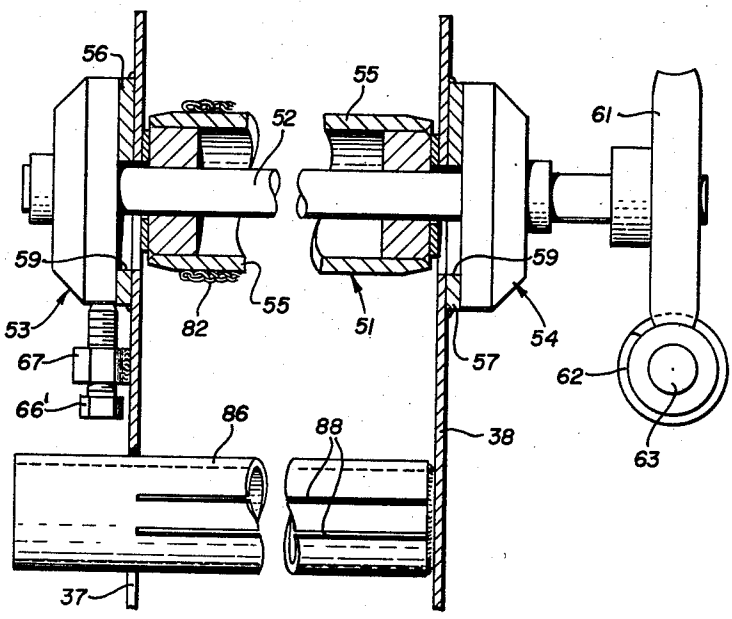
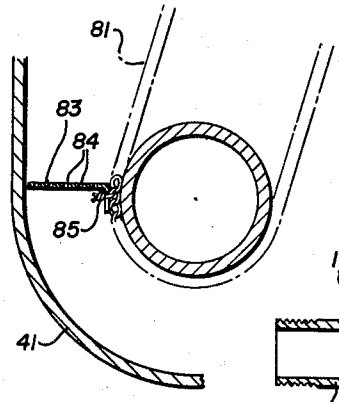



Fig. 3



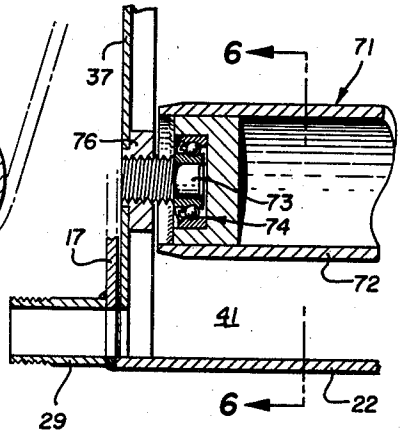




Fig. 6

Fig. 5

INVENTOR
Clark K. Benson
By Fleht and Swain
ATTORNEYS

United States Patent Office 3,159,574 Patented Dec. 1, 1964



3,159,574

# CATCH BOX

Clark K. Benson, Millbrae, Calif., assignor to Heat and Control, Inc., San Francisco, Calif., a corporation of California

Filed Jan. 23, 1961, Ser. No. 84,226
3 Claims. (Cl. 210—237)

This invention relates to a catch box and more particularly to a conveyor type catch box.

In the cooking or frying of foods in fats and oils, as for example, in the quantity cooking or frying of potato chips, French fries and the like in oil, it is necessary that small particles which drop from the potato chips, French fries and the like which are called fines, be removed from the oil to prevent the fines from becoming charred and burned causing the oil to become discolored, rancid and the like. Catch boxes provided with wire strainers or baskets have heretofore been provided to separate the fines from the oil. Collection or removal of the fines in this manner has been found to be very undesirable because constant attention of an attendant is required. It has been found that if the catch box is neglected for even a short period of time, the fines in the basket may substantially impede the flow of oil. This may cause air to be drawn into the pump so that the oil pressure drops markedly to cause the entire system to be shut down. In addition, it has been found that the job of emptying the basket at periodic intervals is laborious and time consuming. There is, therefore, a need for a new and improved catch box which will rapidly and expeditiously remove the fines from the cooking oils without the need of constant supervision.

In general, it is an object of the present invention to provide a catch box which is particularly adapted for removing fines from cooking fats and oils.

Another object of the invention is to provide a catch box of the above character which is provided with conveyor type means for removing the fines.

Another object of the invention is to provide a catch box of the above character in which a fine mesh conveyor belt is utilized for removing the fines from the fats and oils.

Another object of the invention is to provide a catch box of the above character in which the fats and oils pass through the conveyor belt as it passes through the catch box.

Another object of the invention is to provide a catch box of the above character in which particularly novel means is utilized for removing the fines collected on the conveyor belt.

Another object of the invention is to provide a catch box of the above character in which means is provided to prevent fines from settling in the bottom of the catch box.

Additional objects and advantages of the invention will appear from the following description in which the preferred embodiment is set forth in detail in conjunction with the accompanying drawings.

Referring to the drawings:

FIGURE 1 is a cross-sectional view taken along the line 1—1 of FIGURE 2 showing a conveyor box incorporating my invention.

FIGURE 2 is a side elevational view with certain parts broken away of the conveyor box shown in FIGURE 1.

FIGURE 3 is a cross-sectional view taken along the line 3—3 of FIGURE 1.

FIGURE 4 is a cross-sectional view taken along the line 4—4 of FIGURE 2.

FIGURE 5 is a cross-sectional view taken along the line 5—5 of FIGURE 1.



FIGURE 6 is a cross-sectional view taken along the line 6—6 of FIGURE 5.

FIGURE 7 is a partial side elevational view of the conveyor box.

FIGURE 8 is a view taken along the line 8—8 of FIGURE 7.

FIGURE 9 shows a schematic piping diagram for the catch box.

In general, the catch box consists of a container which has inflow and outflow passages disposed near the lower end thereof to permit the passage of the fats and oils through the container. A container having an endless belt of a mesh material is disposed within the container so that oil passing through the container flows through the belt and so that the upper end of the conveyor extends above the top of the container. The catch box also includes means for introducing jets of air through the upper end of the belt to remove collected fines from the belt.

As shown in the drawing, my catch box consists of a container or box 11 which is formed with a top section 11*a* and a bottom section 11*b*. Both of the sections are substantially rectangular and are formed of a suitable material such as sheet steel. The top section 11*a* is provided with side walls 12 and 13, end walls 14 and 16, and an outwardly extending flange or rim 15 whereas the bottom section 11*b* is formed with side walls 17 and 18, end walls 19 and 21, and a bottom wall 22. The end wall 21 is provided with an inlet passage 23 which is spaced slightly above the bottom wall 22 and which communicates with an inlet coupling 24. The end wall 19 is provided with an outlet passage 26 which is immediately adjacent the bottom wall 22 and which communicates with an outlet coupling 27. The bottom wall 22 is provided with a drain connection 28 which is adjacent the outlet passage 26.

A piping connection 29 is provided in the side wall 17 immediately adjacent the bottom wall 22 and near the end wall 21 for a purpose hereinafter described. Additional piping connections 31 are provided in the end wall 16 of the upper section 11*a*, also for a purpose hereinafter described.

A conveyor 36 is mounted within the container 11 and consists of a pair of side frame members 37 and 38 which are fastened together by transverse angle members 39. The lower ends of the side frame members 37 and 38 rest in the lower left hand rounded corner 41 of the container 11 as viewed in FIGURE 1. The upper end of the conveyor is supported by a suitable means such as the pin type connections 42 secured to the top flange 15 of the upper section 11*a* and to the side frame members 37 and 38. Each of the pin type connections consists of a pointed pin 44 which is secured to the flange 15 by suitable means such as welding. The pin 44 is adapted to be seated in a cylindrical type member 46 (FIGURE 8) secured to the associated frame member.

The conveyor 36 also includes inturned bottom flanges 47 which are formed on the side frame members 37 and 38. A hopper 48 provided with a handle 49 is detachably mounted on the side frame member 37 and 38 and the bottom wall 22. The hopper is provided with flanges 50 which cooperate with flanges 45 provided on the side frame members 37 and 38.

A drive roller assembly 51 is rotatably mounted in the upper ends of the side frame members 37 and 38. It consists of a shaft 52 which is rotatably carried in ball bearing assemblies 53 and 54. A roller 55 is mounted on the shaft 52 as shown. The ball bearing assemblies are mounted adjacent to plate-like members 56 and 57 which are mounted on the side frame members 37 and 38 for limited axial movement with respect to the side

frame members 37 and 38. The plate-like members 56 and 57 are provided with elongated openings 59 to permit movement of the shaft 52 axially of the frame members 37 and 38 without movement of the plate-like members.

The shaft 52 is fixed to a gear 61 that is driven by worm gear 62 which is fixed to the output shaft 63 of a gear motor 64. The gear motor 64 is supported by motor bracket 66 secured to the sidewall 12 of the box or container 11. The position of the end of the shaft 52 connected to the gear motor 64 is adjusted axially with respect to the conveyor by placing shims (not shown) between the bracket or mount 66 and the gear motor 64. The position of the other side of the shaft 52 is adjusted by a set screw 66' threaded into a nut 67 fastened to the side frame member 37. As shown particularly in FIGURE 3, the screw 66' is adapted to engage the bearing 53.

A lower roller assembly 71 is rotatably mounted in the lower portion of the side frame members 37 and 38 of the conveyor. The lower roller assembly 71 includes a roller 72 which is rotatably mounted on a stud shaft 73 on each end by a roller bearing assembly 74. The stud shaft 73 is threaded into a nut 76 affixed to the associated side wall of the conveyor.

An endless belt 81 of woven material is mounted on the rollers 55 and 72. The belt 81 is preferably formed of a material which can be woven to provide relatively small openings as for example openings smaller than one-eighth (⅛) of an inch. A belt having such openings formed from bright woven steel was found to be very satisfactory. To facilitate driving the belt, the roller 55 is wound with a separate section 82 of the material and which is secured to the roller 55 by a suitable means such as rivets (not shown). The tension of belt 81 can be adjusted by use of the screw 66' and by placing shims (not shown) between the motor mount 66 and the gear motor 64. Flights 83 provided with perforations 84 are fastened to the belt 81 at spaced intervals with suitable means such as wire ties 85. The flights extend from the belt at substantially right angles.

Means is provided for causing high velocity jets of air to be passed through the woven belt and consists of a pipe 86 which has one end fixed to the side frame member 38 and the other end extending through the side frame member 37 at a point which is slightly below the roller assembly 51 but substantially above the bottom portion of the hopper 48 as shown particularly in FIGURE 1. The pipe 86 is provided with a pair of milled slots 88 extending for the width of the conveyor which face towards the hopper 48 for a purpose hereinafter described.

The schematic piping diagram for the catch box is shown in FIGURE 9. As shown, the pipe 86 is connected to a motor driven blower 91 through a valve 92 by line 93. As also shown in FIGURE 9, the upper inlet coupling 31 is connected by piping 96 and 97 to a heat exchanger through valves 98. Additional piping 101 and a valve 102 connect the piping 96 to the input 29.

Operation of my conveyor type catch box can now be described as follows. With the piping diagram shown in FIGURE 9, the catch box would have its inlet 24 connected to the discharge of the fryer or cooker and the discharge pipe 27 of the catch box would be connected to a pump (not shown) which is connected to a heat exchanger (not shown) or directly to the fryer. If the fryer is provided with an integral heating unit, the heat exchanger is not required in such a case the discharge pipe 27 would be connected directly to the fryer.

When the cooking fats and oils flow from the fryer into the inlet passage 23, the oil must flow through the woven belt 81 which extends across the width of the conveyor box. The oil in the catch box normally assumes the same level as the oil in the fryer. This level is indicated at 106 in the catch box. Any large particles that are carried by the oil are picked up by the flights 83 and are carried upwardly and dropped into the hopper 48. Any small pieces of material which pass through the perforations 84 are picked up by the woven mesh belt and are carried by the belt upwardly out of the oil. Since the fines often become imbedded within the woven mesh belt, the jets of air passing from the slots 88 in the pipe 86 pass through the return run of the woven belt and serve to clear the belt of all fines and cause the same to be discharged through the hopper 48. In this way, before the belt returns into the oil, the belt is completely cleared of all fines and other material which has been picked up by the belt.



The belt is operated continuously by the motor 64 and thus, as the oil passes through the conveyor box the fines are continuously removed from the oil. The fines drop through the hopper 48 into a suitable receptacle (not shown) where they can be collected and later disposed of.

Oil from the heat exchanger is introduced through the connections 31 and falls into the box and is carried through the box into the outlet passage 26. The additional stream of oil from the heat exchanger through the inlet coupling 29 is provided to prevent the collection of fines and the like below the conveyor assembly so that there is no opportunity for fines to clog the conveyor belt. When no heat exchanger is used, the coupling 29 is connected directly to the outlet from the pump so that a flow of oil is always maintained below the conveyor assembly.

It is apparent from the foregoing that I have provided a new and improved catch box which is particularly adapted for removing fines from cooking fats and oils. The catch box is of a type which does not require continuous supervision and which will operate for long periods of time with little or no supervision. It is merely necessary to keep the hopper free of the fines which are picked up by the conveyor. By utilizing the jets of air, relatively fine woven mesh belts can be utilized so that very small fines can be removed from the cooking oil. The jets of air serve to keep the woven mesh relatively clean so that the cooking oil can readily pass through the catch box.

I claim:

1. In a catch box for removing fines from a liquid, a rectangular container open at the top to form a rim there around and having inflow and outflow passages disposed near its lower end, a conveyor assembly removably resting unattached on the bottom of said container and said rim, the conveyor assembly comprising a pair of side frame members, a drive roller and a driven roller rotatably mounted in the side frame members, an endless belt of relatively fine woven material mounted on said drive and driven rollers, said belt carrying lifting flights disposed transversely thereof, the flights projecting outwardly from the belt and having perforations therein, the conveyor assembly being arranged so that the belt is disposed between the inflow and outflow passages and substantially at right angles to the path of flow of liquid through the container, the conveyor assembly having a width equal to the width of the container and being positioned on the bottom of the container, the lower end of the conveyor being spaced from the bottom wall a distance substantially equal to the outward projection of said flights whereby substantially all of the liquid passing from the inflow to the outflow passages must pass through the belt or the flights, the lower end of the conveyor being disposed in the lower end of the container at the corner thereof and being inclined upwardly and having its upper end extending above the upper end of the container, said belt serving to remove the fines from the liquid as the liquid passes through the belt, a pipe mounted in the side frame members of the conveyor between the conveyor belt, the pipe having openings therein facing towards the return run of the conveyor belt, and means for applying air under pres-

sure to said pipe so that jets of air are introduced through the return run of the belt to remove fines collected by the belt, and a hopper mounted on the upper end of the conveyor assembly, said hopper having an opening through which the fines discharged from the conveyor assembly may pass.

2. A catch box as in claim 1, together with separate means for introducing a stream of fluid under pressure into said container in a region adjacent to the lower end of the container between the lower end of the belt and the bottom wall of said container at the lower end to agitate any fines present in said region whereby said fines are picked up by said endless belt.

3. A catch box as in claim 1 wherein said hopper is fixedly secured to the conveyor assembly whereby said hopper and said conveyor may be removed from said container as a unit.



**References Cited** in the file of this patent

UNITED STATES PATENTS

| | | |
|---|---|---|
| 1,716,376 | Geiger | June 11, 1929 |
| 1,789,425 | Cabrara | Jan. 20, 1931 |
| 2,044,214 | Jones | June 16, 1936 |
| 2,572,236 | Anderson | Oct. 23, 1951 |
| 2,899,062 | Heacock | Aug. 11, 1959 |
| 3,012,677 | Hungate | Dec. 12, 1961 |

FOREIGN PATENTS

| | | |
|---|---|---|
| 322,935 | Germany | July 12, 1920 |