May 19, 1936. W. L. GOODMAN 2,041,175

FRYING AND COOKING APPARATUS

Filed July 10, 1931 5 Sheets-Sheet 1

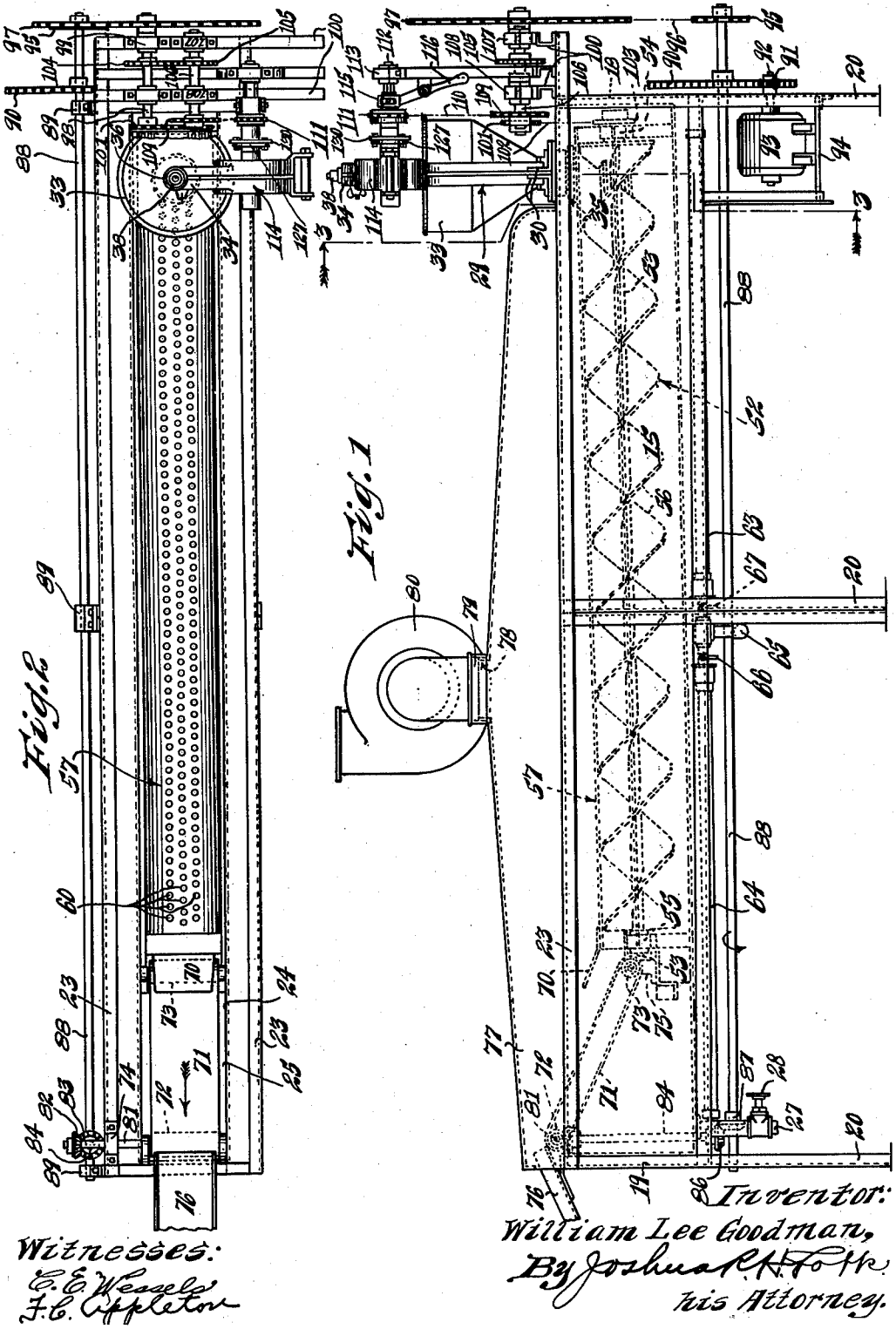


Fig. 1

Fig. 2

Witnesses:
E. E. Wessels
F. C. Appleton

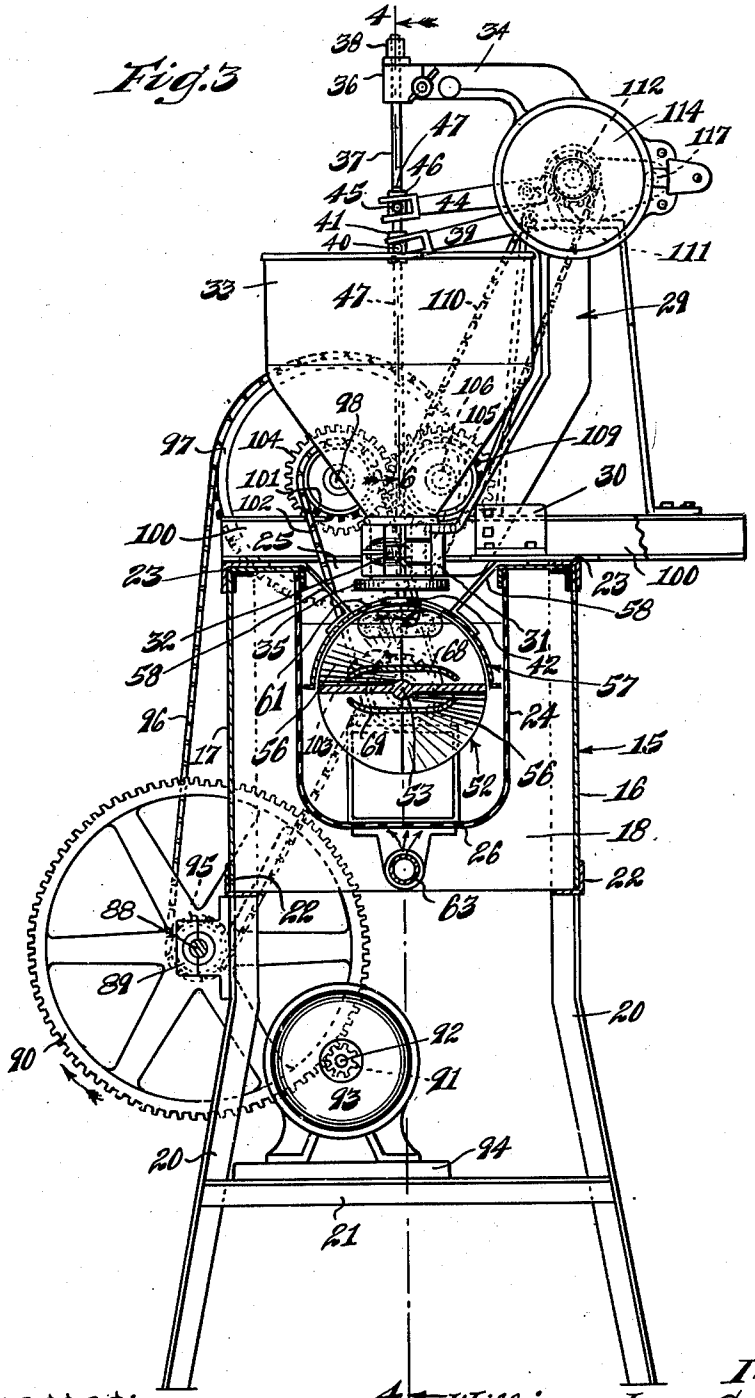
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FRYING AND COOKING APPARATUS

Filed July 10, 1931 5 Sheets-Sheet 2

Fig. 3



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FRYING AND COOKING APPARATUS

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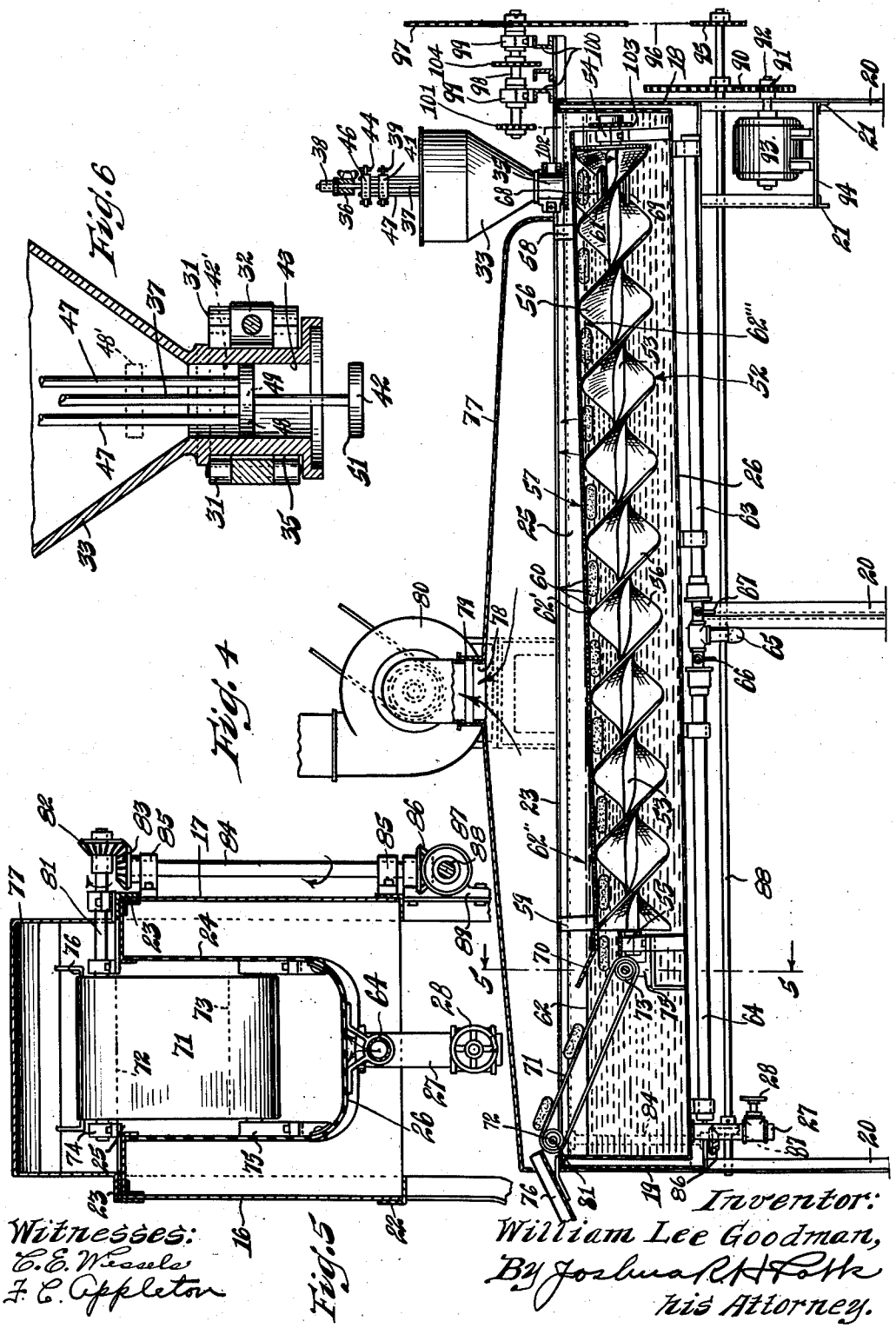


Fig. 6

Fig. 4

Fig. 5

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May 19, 1936. W. L. GOODMAN 2,041,175

FRYING AND COOKING APPARATUS

Filed July 10, 1931 5 Sheets-Sheet 4

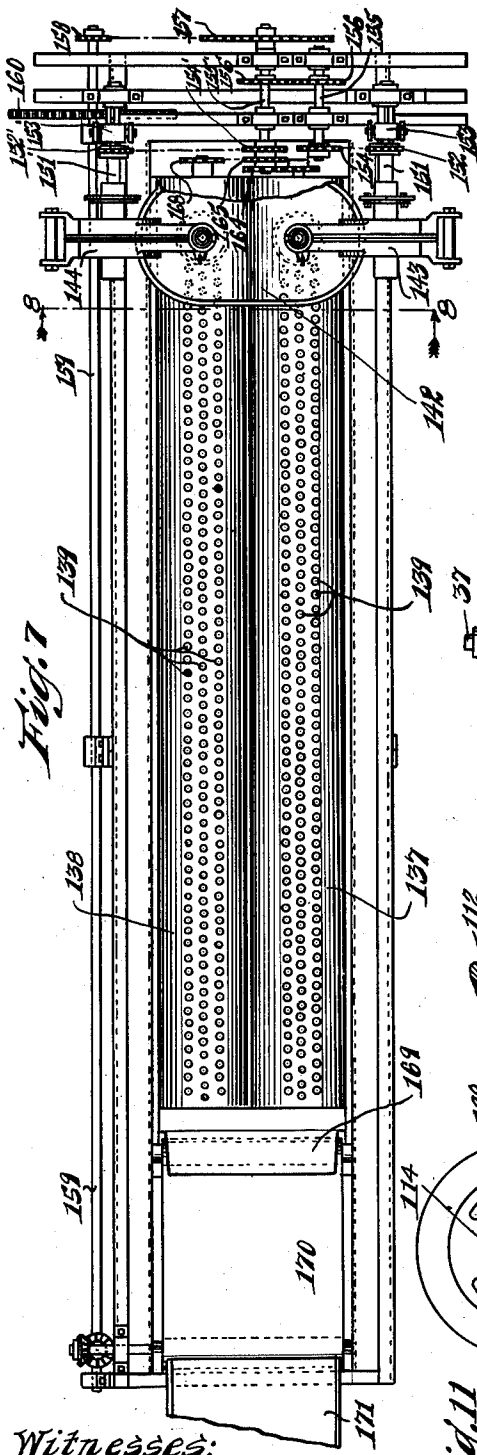


Fig. 7

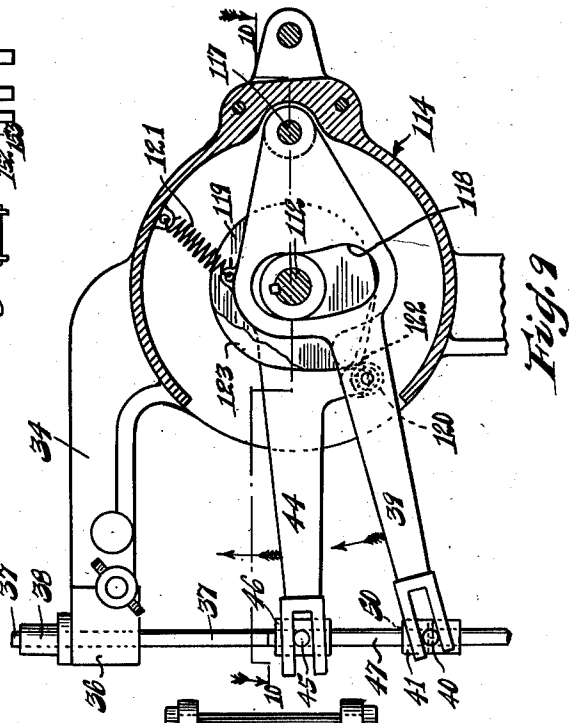


Fig. 9

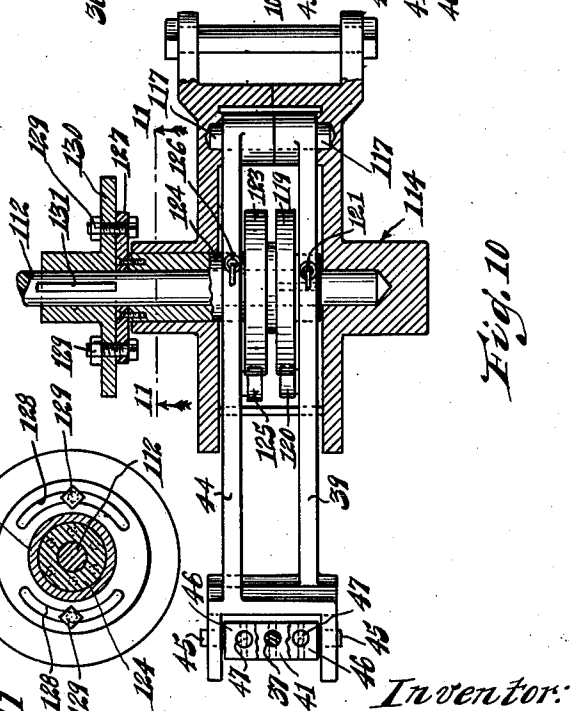


Fig. 10

Fig. 11

Witnesses:
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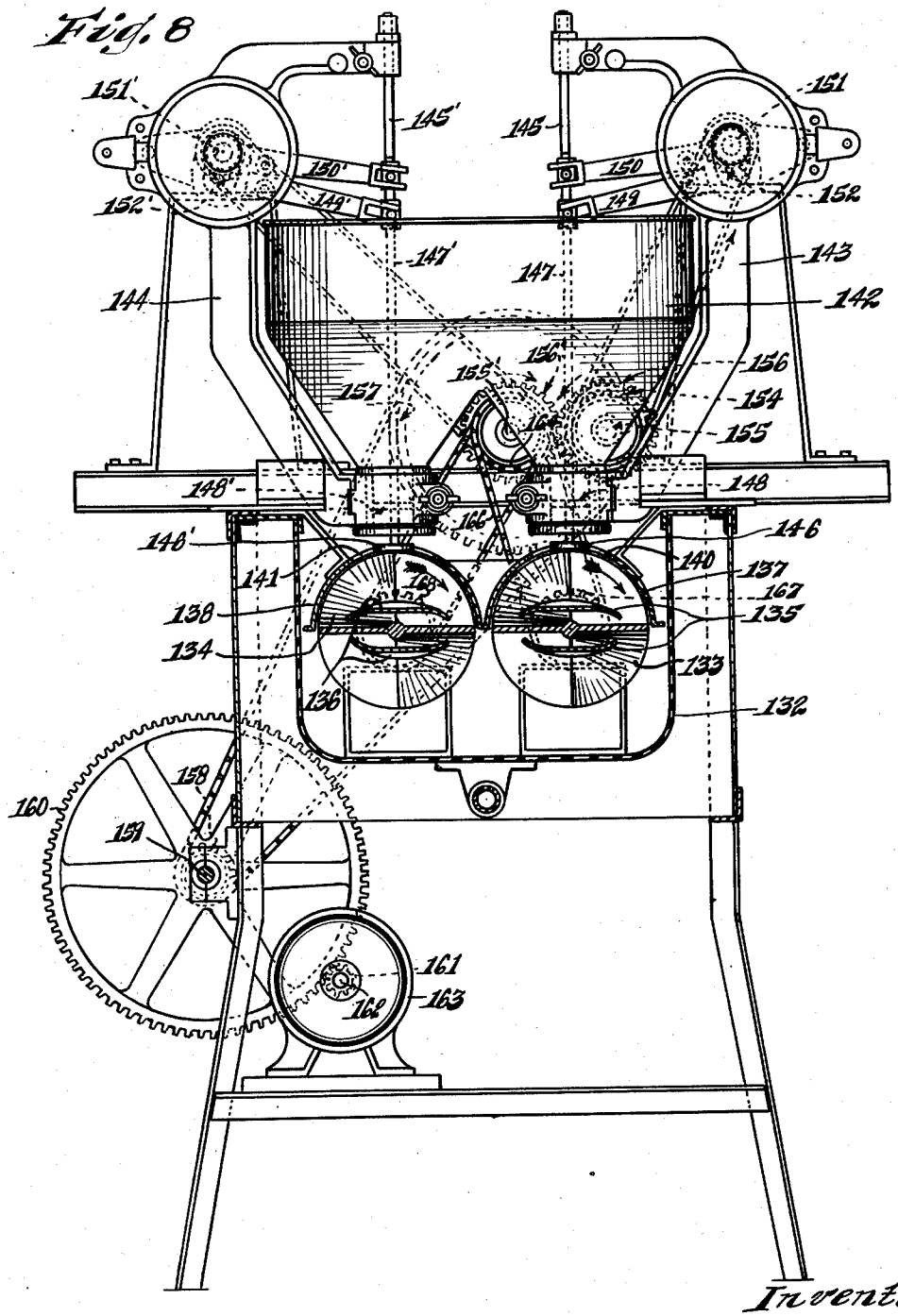
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May 19, 1936. W. L. GOODMAN 2,041,175

FRYING AND COOKING APPARATUS

Filed July 10, 1931 5 Sheets-Sheet 5

Fig. 8



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Patented May 19, 1936 2,041,175

UNITED STATES PATENT OFFICE

2,041,175

FRYING AND COOKING APPARATUS

William Lee Goodman, Chicago, Ill., assignor to Bear-Stewart Co., a corporation of Illinois

Application July 10, 1931, Serial No. 549,923

8 Claims. (Cl. 53—7)

This invention relates to apparatus for frying and cooking doughnuts or similar articles.

An object of the invention is the provision of an improved machine or apparatus for more thoroughly, evenly, and speedily cooking doughnuts and the like. A specific object, among others, is the provision of improved means for conveying formed but uncooked doughnuts through a cooking medium to cook the same. Another object is the provision of mechanism for so cooking doughnuts and like material without turning the same. Still another object is the provision of improved timing mechanism employed in such apparatus especially in connection with pluralities of such apparatus.

The invention also has for an object the provision of mechanism for accomplishing the said results which will be simple of construction, easy of manufacture and relatively inexpensive.

These and other objects and advantages of my invention will appear from the specification hereinafter set forth.

The invention consists in the combinations and arrangements of parts hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings, forming a part of this specification, and in which:

Fig. 1 is an elevational view of a preferred form of the machine of the present invention;

Fig. 2 is a plan view of the machine shown in Fig. 1, with the upper hood removed;

Fig. 3 is an enlarged sectional view of the machine, taken on the line 3—3 of Fig. 1;

Fig. 4 is a longitudinal section, taken substantially on the line 4—4 of Fig. 3;

Fig. 5 is a transverse sectional view, taken substantially on the line 5—5 of Fig. 4;

Fig. 6 is a detail sectional view of the feeding and forming mechanism;

Fig. 7 is a plan view of a modified form of the device, with the hood removed;

Fig. 8 is an enlarged sectional view, taken substantially on the line 8—8 of Fig. 7, showing the mechanism for operating the modified form;

Fig. 9 is a detail sectional view of the means for operating the feeding and forming mechanism;

Fig. 10 is a plan sectional view of the mechanism shown in Fig. 9, taken on the line 10—10 of Fig. 9; and

Fig. 11 is a detail sectional view, taken substantially on the line 11—11 of Fig. 10, illustrating the means for adjusting the feeding and forming mechanism.

The preferred form of construction as illustrated in the drawings comprises a housing 15 having side walls 16 and 17, and end walls 18 and 19. The housing is supported by a plurality of legs 20, and the adjacent legs are connected by braces 21. The housing 15, as shown, is provided with lower and upper angle irons 22 and 23, respectively, for reinforcement. Suspended from the upper angle irons 23 is a cooking fluid container 24, as particularly shown in Figs. 1, 2, 3, 4, and 5, said container being open at the top 25. The container 24 has an inclined bottom 26, as especially shown in Figs. 1, 4, and 5, the purpose of which is to permit the cooking fluid contained therein to drain into a drain pipe 27 controlled by a valve 28.

Mounted at one end of the housing 15 upon one of the angle irons 23 is a standard 29 which is further secured by brace members 30, said brace members being also affixed to one of the said angle irons 23. The standard 29 has integral with its lowermost extremity a hinged yoke member 31, which is provided with a swiveling wing nut 32 adapted to lock the hinge portions of the yoke member 31. The purpose of the yoke member 31 is to provide a support for a hopper 33, which may have contained therein a doughnut mixture from which portions may be cut and formed into doughnuts. The hopper may be detachably mounted in the yoke member 31 by operating the swiveling wing nut 32 and moving the same out of engagement with the movable portion of the yoke member 31 so that the movable portion may be swung outwardly. The hopper 33 may be positioned thereupon against the fixed portion of the yoke member 31 and the movable portion may then be swung toward the fixed portion and the two portions locked together by means of the wing nut 32 to securely retain the hopper therein.

The upper end of the standard 29 is provided with an overhanging arm 34, whose end terminates at a point substantially above the center of the neck portion 35 of the hopper 33 and the arm 34 at its end 36 is split and apertured to receive and accommodate a vertically reciprocating doughnut forming member 37. A collar 38 is provided on the top of the end 36 of the arm 34 for guiding the movement of the member 37. The reciprocation of the member 37 is accomplished by a bifurcated rock arm 39 which operates a pin 40 rigidly mounted on a block 41 secured to the member 37. The operating and timing mechanism for this rock arm and other related mechanism will be described hereinafter

more in detail. The lower end of the member 37 is provided with a forming head 42 which is cylindrical in form and the diameter of which is slightly less than the diameter of the port 43 of the neck portion 35 of the hopper 33, whereby the port 43 will be closed when the head 42 is located within the port in raised position.

For the purpose of operating dough cutting elements, a rock arm 44 is provided, bifurcated similarly to rock arm 39. The bifurcated portions are constructed and arranged to engage a pair of pins 45 which are secured to a block 46 slidable on the doughnut forming member 37. Also fixed to the block 46 are a pair of vertical reciprocatory rod members 47 which are equipped at their lower ends with a cylindrical member 48 similar in form and dimensions to the member 42, which member 48 is apertured at 49 to allow for the reciprocation of the member 37. The rod members 47 have a parallel vertical relationship, not only with each other, but with the member 37, and are adapted to reciprocate in apertures 50 in block 41.

The rock arm 39 operates the pin which is mounted to the member 37 and thereby rocks or reciprocates the member 37 vertically. In the same manner the rock arm 44 rocks or reciprocates the member 48 vertically through the port 43 of the neck portion 35 of the hopper 33. In the operation of these elements the member 48 may be rocked through the instrumentality of the rock arm 44 to its uppermost position which is indicated at 48' in Fig. 6. At the same time the member 42 may be rocked vertically to its uppermost position as indicated by 42' by virtue of the rock arm 39. When both members 48 and 42 have been so raised to their uppermost positions, port 43 will then have been opened, that is, member 48 will have been reciprocated upwardly out of the port, and if the dough or other mixture in the hopper is of such fluidity as to be responsive to gravity, the dough or other substance may then flow into the port 43. In case the dough is not of such a nature as to flow of its own accord into the port, I have provided for suctional force, in the downward movement of the member 42 in my preferred form as shown especially in Fig. 6. The forming member 42, after both it and the member 48 have been rocked to their uppermost positions, starts its downward reciprocation in advance of the downward reciprocation of the member 48, and thereby suction may be created sufficient to draw the dough or other medium into the port 43. When sufficient dough has been transmitted into the port 43, the member 48 is reciprocated downwardly and prevents any further dough being conveyed into the port 43, the relation between the reciprocatory movements of the members 42 and 48 depending upon the amount of dough desired. When the member 48 has been reciprocated downwardly into the port 43 and has closed the same, the member 42 continues its downward reciprocation until forming member 42 projects downwardly from the port 43. At the same time the member 42 is thus being projected downwardly the member 48 is following, at a slightly faster rate if desired, and the member 48 may assist in positioning the dough on the upper surface of the forming member 42 and further may assist by its pushing action in the discharge of the dough on the forming member 42. When the forming member 42 has been projected downwardly out of the port 43, the dough, being no longer retained on the upper surface of the member 42 by the walls of the port 43, flows by the force of gravity from the upper surface of the member 42 over the edge 51 of the member 42 into the cooking fluid. There results a doughnut having a hole in the center, which doughnut is uncooked. The general operating mechanism for the hopper is related to the entire device and will be described more in detail hereinafter, for convenience.

Mounted in the cooking fluid container 24 is a double threaded screw propeller or conveyor 52. The propeller 52 comprises a shaft 53 which is journaled in bearings 54 and 55. The bearing 54 is higher than the bearing 55, and it is thereby rendered possible to journal one end of shaft 52 higher than the other and to provide thereby an inclined shaft and propeller as particularly appears in Fig. 4, and in the preferred form shown the shaft and conveyor have been inclined downwardly from the feeding to the discharge end. The function of the screw-threaded propeller or conveyor is to advance the doughnuts from the feeding end to the discharge end by means of a counterclockwise movement of the conveyor 52. The propeller or conveyor is mounted in operation in the container 24 in the cooking fluid therein, and the doughnuts flow therein. The threads 56 of the conveyor or propeller may propel the medium in a direction from the feeding to the discharge end and thereby the doughnuts may be carried by flotation or other similar force. In my preferred form the device is so arranged that one doughnut is located between each pair of threads, substantially. Mounted above the screw-conveyor 52 is a submerging guide 57 which is loosely supported by brackets 58 and 59 resting on the container 24, the brackets being secured at their other ends to the submerging guide 57, thereby holding the same in suspended position over the conveyor. As particularly shown in Figs. 2 and 3, the guide 57 extends longitudinally the whole length of the propeller or conveyor and is semi-cylindrical transversely. It may be observed that the bracket 58 is shorter than the bracket 59, which permits the submerging guide 57 to be arranged in an inclined position over the propeller or conveyor 52, the inclination being downwardly from the feeding to the discharge end.

Submerging guide 57 is provided with a plurality of perforations 60, the purpose of which will be explained hereinafter. At the feeding end of the device directly under the neck of the hopper and registering with the cutting and forming members of the doughnut forming mechanism, the submerging guide 57 is provided with an opening 61. As will be particularly apparent from Figs. 3 and 4, the purpose of this opening is to permit the formed but uncooked doughnut to pass downwardly through the submerging guide 57 into the cooking fluid which is contained in the container 24.

For convenience, a reserve tank or reservoir may be arranged above the container 24 for containing a reserve of lard or other cooking medium, which may be heated by obvious means to a suitable degree. A drawoff valve may be provided in said reservoir which is adapted to discharge into the container 24 so that the fluid in the container 24 may be replenished after it is used and the desired level therein maintained substantially constant.

With respect to the cooking medium, the level thereof is arranged so that in my preferred form somewhat more than one-half of the submerging guide 57 is submerged entirely in the cooking fluid.

With respect to the other portion of the submerging guide 57, the upper part thereof extends above the cocking medium. The arrangement is clearly shown in Fig. 4, and the level of the lard is clearly illustrated by line 62. At 62' it will be seen that the line of the level of the lard and the line of the upper surface of the submerging guide intersect. At 62'' the line of the level of the lard is shown to be above the top of the submerging guide 57. At 62''' it will be seen that the top of the submerging guide 57 is located above the level of the lard.

The cooking medium may be heated to the proper degree by the provision of gas jets 63 and 64 through which gas is supplied by means of supply pipe 65, valves 66 and 67 being provided for control.

Also mounted upon the shaft 53 of the screw propeller or conveyor 52 are a pair of plates 68 and 69. In operation one or the other of these plates is turned upwardly to receive a formed but uncooked doughnut when the same is dumped from the forming member 42 into the cooking medium. Among other functions of these plates, they are so constructed and arranged as to limit and influence the fall of the uncooked doughnut so that the same will have a desired shape and will not be crushed or injured.

In the general operation of the elements so far disclosed the cooking and forming members 48 and 42 may be actuated by their respective rock arms to form and deposit an uncooked doughnut in the cooking fluid, which doughnut may be received by one of the plates 68 or 69. While the hopper is being operated, the screw conveyor is being rotated in a counter-clockwise motion and when the uncooked doughnut has been dumped upon one of the plates 68 or 69, one of the threads 56 of the screw propeller 52 will, by its action upon the cooking fluid and upon the uncooked doughnut, floating in the cooking medium, cause the same to move forward from the feeding to the discharge end.

It will be noted from Fig. 4 that when the doughnut is first dropped in the cooking fluid, the doughnut after rising to the surface floats in the cooking medium and only the under portion is submerged, and only the under portion is cooked. As the doughnut is advanced by the threads of the screw propeller in their counter-clockwise motion the space between the top of the submerging guide 57 and the level of the lard is gradually diminished and in due course the upper surface of the doughnut comes in contact with the submerging guide 57. By virtue of its contact with the cooking fluid the submerging guide has become heated and operates to cook the doughnut on its upper side. As the doughnut progresses from the feeding to the discharge end it gradually becomes entirely submerged, especially where the submerging guide itself is completely submerged in the cooking medium. Inasmuch as the doughnut seeks to flow to the top of the cooking medium, the same floats under and along the submerging guide 57 in the cooking medium urged by one of the threads of the screw propeller 52. The doughnut progresses in this fashion to the discharge end of the device. Mounted upon the submerging guide 57 is a guide 70, especially shown in Fig. 4, which is arranged at the discharge end of the submerging guide 57. Also arranged adjacent the discharge end of the submerging guide is a discharge conveyor 71 mounted upon rollers 72 and 73 journaled in bearings 74 and 75.

It may be observed that the upper roller 72 is disposed above the level of the lard and that the lower roller 73 is disposed under the level of the lard in the container 24. The construction and arrangement is such that when the cooked doughnut reaches the discharge end of the submerging guide 57 it will then float upwardly under the guide 70 until it drops on the conveyor 71 and is carried to a discharge chute 76. A hood 77 is arranged above the housing 15, being mounted upon the members 23. The upper end of the hood 77 is provided with a discharge neck 78 adapted to cooperate with the sleeve member 79 of a suction fan 80 which is provided for the purpose of carrying off gases, vapors, etcetera. The hood may be readily removed by raising the sleeve member 79.

With respect to the operating mechanism, the discharge conveyor roller 72 is fixed to a shaft member 81 which at its outer end carries a bevel gear 82 which meshes with a bevel gear 83 on a vertically depending shaft 84 mounted in bearings 85. The shaft 84 is provided at its lower end with a bevel gear 86 which meshes with a bevel gear 87 on countershaft 88 journaled in bearings 89. At its forward end the shaft 88 has mounted thereupon a spur gear 90 in mesh with a pinion 91 mounted on a motor shaft 92 of the motor 93. The motor 93 is supported by a platform 94 which is secured to the framework of the housing 15. Also mounted on the shaft 88 is a sprocket 95 driving a chain 96, which rotates a sprocket 97 mounted on a shaft 98 which is journaled in bearings 99. The bearings 99 are mounted upon channels 100 secured to that portion of the angle iron 23 which extends beyond the feeding end of the housing. Also mounted on the shaft 98 is a sprocket 101 carrying a chain 102, which drives a sprocket 103, which is fixed on the propeller shaft 53 and thereby provision is made for transmitting power from the motor to the conveyor shaft. By this arrangement the propeller or conveyor is operated in counter-clockwise motion to advance the doughnuts from the feeding to the discharge end of the mechanism.

Also mounted on the shaft 98 is a gear 104 which meshes with a gear 105 on a stud shaft 106 journaled in bearings 107 and 108. Also mounted on the shaft 106 is a sprocket 109 carrying a chain 110, which drives a sprocket 111, which is loose on the shaft 112. A journal 113 is provided for the shaft 112. The other end of the shaft 112 is journaled in a housing member 114. A clutch 115 having a handle 116 is provided on the shaft 112 and adapted to be engaged with the sprocket 111, and thereby the power from said sprocket may be transmitted to said shaft 112.

In reference to the rock arms 39 and 44 mentioned heretofore, the same are pivoted to the stud 117 which is integral with the housing member 114. The rock arms 39 and 44 are provided with arcuate slots 118 through which the shaft 112 extends. Mounted at one end of the shaft 112 is a cam 119 which is constructed and arranged for cooperation with a roller 120 pivoted on arm 39. A spring 121 has one end affixed to the housing 114 and the other end connected to the arm 39 whereby the arm 39 is normally held in raised position. It will readily be understood that the arm 39 will be held in raised position until the cam hump 122 engages the roller 120,

when the arm 38 will be depressed, causing the member 37 to be reciprocated downwardly.

Mounted adjacent to the cam 118 is another cam 123 which is integral with a sleeve member 124 which is sleeved about the shaft 112. The cam 124 operates a roller 125 in much the same manner as the cam 118 operates the roller 120, and thereby the cam 123 operates to reciprocate the rock arm 44 and the member 48. In the same manner also a spring 126 is provided to retain the arm 44 in raised position. As particularly shown in Fig. 10, means are provided for regulating the action of the cutting member 48 and thereby controlling the amount of dough or other material which is to be cut for each unit; that is to provide for various sizes of doughnuts, cakes, etcetera. This is accomplished by mounting a disc 127 as shown in detail in Fig. 11. The disc 127 is provided with arcuate slots 128, and adapted to protrude through the arcuate slots are a pair of bolts 129 by which the disc 127 may be secured to a flanged disc 130 whose hub is keyed to the shaft 112 at 131. By loosening the bolts and revolving the member 127 the cam 123 may be adjusted to regulate the amount of dough which is to be fed for particular units, and by tightening the bolts thereon the relationship may be definitely preserved.

In Figs. 7 and 8 I have shown a modified form of my device. In some respects this device is similar to the structure set forth hereinbefore. In Fig. 7 there is shown a structure in which there is one container 132 for the cooking fluid, and mounted within the container 132 is a pair of propellers or conveyors 133 and 134 which are similar to the propeller 52 hereinbefore described. The propellers 133 and 134 are each equipped with pairs of plates 135 and 136, respectively, and mounted above the conveyors 133 and 134 are submerging guides 137 and 138 which are perforated as at 139. Also provided on the submerging guides 137 and 138 are openings 140 and 141 through which a formed but uncooked doughnut may be passed from a twin hopper 142 into a cooking fluid.

In Fig. 8 I have shown in detail a preferred form of my twin hopper. The only difference between the twin hopper 142 proper and the hopper 33 is that the hopper 142 is provided with two neck portions. The hopper 142 is mounted on twin standards 143 and 144 in a manner similar to the mounting of the hopper 33. Also mounted to be reciprocated vertically in the standard 143 is a rod 145 having integral therewith at its lower extremity a forming member 146, and also suitably mounted to be reciprocated vertically in relation to the member 145 are a pair of members 147 having integral at their lower extremities a cutting member 148. The members 145 and 147 are actuated by rock arms 149 and 150, respectively. The operation of the members 145 and 147 by the rock arms is substantially similar to the operation of the members 37 and 47 by rock arms 39 and 44 described hereinbefore, the member 148 being reciprocated vertically through one of the neck portions of the twin hopper, to cut and press unitary portions of dough into the neck portion and against the member 146, and the member 146 is similarly reciprocated vertically through the neck portion and projects downwardly therefrom to allow the dough deposited thereon to fall off to form an uncooked doughnut.

Similarly mounted on the standard 144 or in relation thereto is member 145' having member 146' formed integrally therewith, and member 147' having member 148' formed integrally therewith, which are operated by members 149' and 150' in the same manner in which the members 145, 146, 147, and 148 are operated by rock arms 149 and 150. The arms 149 and 150 are operated by cams and other elements actuated by the shaft 151, which parts are substantially similar to the parts described hereinbefore in relation to rock arms 39 and 44, shaft 151 corresponding to shaft 112. The same mechanism is provided in relation to standard 144 for the operation of the rock arms 149' and 150', said elements being actuated by a shaft 151' corresponding to the shaft 112, and it is understood that the members 145' and 147' are reciprocated through the other neck portion of the twin hopper.

The shaft 151 has loosely mounted thereon a sprocket 152, and likewise the shaft 151' has loosely mounted thereon a sprocket 152'. Clutches 153 and 153' are provided for the purpose of connecting the shaft to the sprocket to transmit the power from the sprockets. As will more fully hereinafter appear, if only the clutch 153 is closed, then only the hopper mechanism mounted in relation to the standard 143 will operate, and the mechanism mounted in relation to the standard 144 will be inoperative, as power will not be transmitted to the shaft 151'. However, if it is desired to operate both hoppers, then both clutches may be thrown closed and power will be transmitted from both sprockets 152 and 152' on the shafts 151 and 151'.

The sprockets 152 and 152', as will clearly appear from Figs. 7 and 8, carry chains, which drive sprockets 154 and 154', said sprockets being mounted on shafts 155 and 155' upon which are in turn mounted gears 156 and 156'. Gear 156 is in mesh with gear 156' and is operated thereby. Also mounted on the shaft 155' is a sprocket 157 which is driven by a chain engaged by sprocket 158 mounted on a shaft 159 on which in turn a gear 160 is also mounted. The gear 160 is in mesh with a pinion 161 mounted on the shaft 162 of a motor 163.

The power for the conveyors is also transmitted from the shaft 155' to the propellers 133 and 134. Shaft 155' has a pair of sprockets 164 and 165. Sprocket 164 drives a chain 166, which engages sprocket 167, which sprocket is connected to the propeller 133. Similarly there is a chain drive from the sprocket 165 to a sprocket 168 connected to the conveyor 134.

It will be seen that from the foregoing mechanism power will be supplied by the motor 163 and transmitted to the shaft 159 and the sprocket thereon, from whence the power will be transmitted to the shaft 155', and from this shaft power will be transmitted to the propellers 133 and 134, and from this same shaft 155' power will also be transmitted to the shafts 151 and 151' by the sprocket elements hereinbefore described.

The modified form of the device shown in Figs. 7 and 8 has a discharge conveyor having a guiding plate 169 which is adapted to guide the cooked doughnuts after the same have traveled to the end of the submerging guides 137 and 138. There is also provided adjacent to the plate 169 the lower end of an endless conveyor 170 adapted to receive the cooked doughnuts and convey them to a discharge chute 171. The conveyor 170 is operated by the shaft 159 through

the medium of a plurality of bevel gears, as clearly appears from Fig. 7.

By the structure disclosed, timing mechanism has been provided whereby the rock arms may be related to the propeller, not only where the single units are employed but also where my modified structure is used. Referring to Fig. 8, it may be observed that for every revolution of the propeller or conveyor 133 there will be two revolutions of the shaft 151. In other words, every time the shaft 151 rotates, one formed but uncooked doughnut will be deposited, whereas, when the conveyor makes one complete revolution, both of the plates will have been presented to the hopper, and will each have received one doughnut. By the mechanism especially as shown in Fig. 8, means have been provided whereby every time the doughnut cutting and forming mechanism is actuated to deposit a doughnut, one of the plates 135 will be squarely presented for the reception of a doughnut.

In the operation of the device in the form shown in Figs. 1 to 6, when the motor is operated power is transmitted through the various gears, shafts and sprockets to the shaft 112 which will cause the vertical reciprocation of the members 37 and 47. It is understood that a quantity of doughnut material or other such material has been placed in the hopper 33. The member 48 will be reciprocated vertically upwardly from the port 43, and the member 42 will be reciprocated upwardly into the port 43. In my preferred form, both members 48 and 42 will travel upwardly but the member 42 will start its downward reciprocation in advance of the member 48, although the relative movement may be adjusted to the particular circumstances. With the downward movement of the member 42, suction will be created which will cause a certain amount of doughnut material to be sucked down into the port 43 if the doughnut material is not of such fluidity as to flow by gravity into the port 43 of its own accord. After the requisite amount of material has been conveyed into the port 43 the member 48 will be reciprocated downwardly into the port, preventing further transmission of material into the port and the member 48 may continue downwardly to assist in the positioning of the material on the member 42. Continuing its downward reciprocation, the member 42 will be projected downwardly out of the port 43, and the material retained thereon no longer being contained by the walls of the port 43, will flow by gravity from the upper surface of the member 42 over the edge 51 into the cooking fluid.

As clearly appears from Fig. 4, the uncooked doughnut drops by gravity into the cooking medium and strikes one of the plates 68 or 69 which will intercept the downward travel of the uncooked doughnut and prevent contact with portions of the propeller which might result in mutilation of the doughnut, or other injury. It is understood that the propeller is so timed that when the doughnut is dropped from the hopper the upper surface of one of the plates 68 or 69 will be presented to the doughnut. The doughnut after striking the plate rises to the surface and floats thereon and is conveyed in the cooking medium by flotation as a result of the counter-clockwise movement of one of the threads of the double threaded screw propeller or conveyor shown. As described hereinbefore in detail, the doughnut at first is out of contact entirely with the submerging guide 57, as pointed out hereinbefore at 62'', but later, because the submerging guide 57 is inclined downwardly and gradually passes from above the surface of the cooking medium into and beneath the surface thereof, the doughnut floating on the top of the cooking medium gradually contacts the submerging guide 57, and from that point on is gradually submerged and forced from the feeding end to the discharge end, floating under and in contact with the submerging guide 57. As stated hereinbefore, the point 62' shows more or less the point of initial contact between the doughnut and the submerging guide 57, while point 62'' shows the doughnut and the submerging guide entirely submerged in the cooking medium. While the doughnut progresses from the feeding end of the mechanism to the point of contact with the submerging guide, the under side of the doughnut is being cooked, while the upper side is relatively uncooked. However, after the point of contact is reached the upper side of the doughnut is cooked, and the rate of cooking from that point on of the upper side is sufficiently greater than that of the rate of the under side so as to permit the upper side to be evenly cooked with the under side when the doughnut reaches the discharge end of the conveyor, although the under side has been cooking over a longer period of travel. By this means without any turning over of the doughnut or any similar expedient, an evenly and thoroughly cooked doughnut is attained with an adjustable amount of cooking fluid contained therein and without the cracking and other defects as in many if not all of the processes heretofore in use, not to mention the advantages with respect to cleanliness and handling. After the doughnuts reach the end of the submerging guide they are permitted to travel upwardly under the inclined plate 70 and are directed onto the conveyor which conveys them to the discharge end.

In the modified form, by the structure shown in Figs. 7 and 8, either one or both of the hopper mechanisms may be operated through the clutches 153 and 153'. Both of the clutches may be thrown and then power will be transmitted from the motor to the shaft 155', from which power may be transmitted to the plurality of conveyors and to the plurality of hopper mechanisms.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. Cooking apparatus of the character described comprising, in combination, a tank for holding a cooking fluid, means for feeding doughnuts or the like to be cooked into said fluid, a conveyor located in said tank for advancing the uncooked doughnuts from the feeding end through the fluid to the discharge end of said apparatus, and a plate on said conveyor mounted beneath the feeding means in the cooking fluid to receive said doughnuts or the like after the same have been fed into the fluid, to prevent the same from being mutilated.

2. Cooking apparatus of the character described comprising, in combination, a tank for holding a cooking fluid, means for feeding material to be cooked into said fluid, a propeller screw for advancing material from the feeding

to the discharge end, a semi-cylindrical guide superimposed over said propeller, one end of which is located above the level of the cooking fluid adjacent the feeding means from which said guide is inclined downwardly through the fluid so that its other end is completely submerged.

3. Cooking apparatus of the character described comprising, in combination, a tank for holding a cooking fluid, means for feeding doughnuts or the like to be cooked into said fluid, a propeller located in said tank for advancing the uncooked doughnuts from the feeding end through the fluid to the discharge end of said apparatus, means on the propeller mounted beneath the feeding means in the cooking fluid for receiving the doughnuts after the same have been fed into the fluid to prevent the same from being mutilated.

4. In cooking apparatus of the character described, a cooking fluid tank, means for advancing articles to be cooked through said tank, and a member superimposed over said advancing means, said member being inclined relative to the tank downwardly from the feeding to the discharge end so as to permit the articles to be cooked to float on the surface during the first portion of their advance through the tank to partially cook the articles on their upper exposed sides, and thereafter to submerge the articles during the latter portion of their advance through the tank.

5. Cooking apparatus of the character described comprising, in combination, a tank for holding a cooking fluid, means for conveying material to be cooked into said fluid, and a rotary plate on said means in said cooking fluid upon which the material is adapted to be received and from which it is adapted to be conveyed through the cooking medium.

6. In cooking apparatus of the character described, a cooking fluid tank, a spiral propeller for advancing doughnuts through the cooking fluid, said propeller being inclined relative to the tank downwardly from the feeding to the discharge end, and a curved guide substantially conforming to the upper portion of said propeller and similarly inclined.

7. Cooking apparatus of the character described comprising, in combination, a tank for holding a cooking fluid, means for conveying material to be cooked into said fluid, and rotary means on said conveying means in said cooking fluid upon which the material is adapted to be received and from which it is adapted to be conveyed through the cooking medium.

8. A cooking apparatus of the character described, a cooking fluid tank having an upper portion and a lower portion, means for advancing articles in said tank, and a guide superimposed over said advancing means adapted and arranged and in such a relation to the cooking fluid in the tank that the upper portion of said guide is adapted to cooperate with the advancing means to cause the articles to be advanced in a definite path.

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