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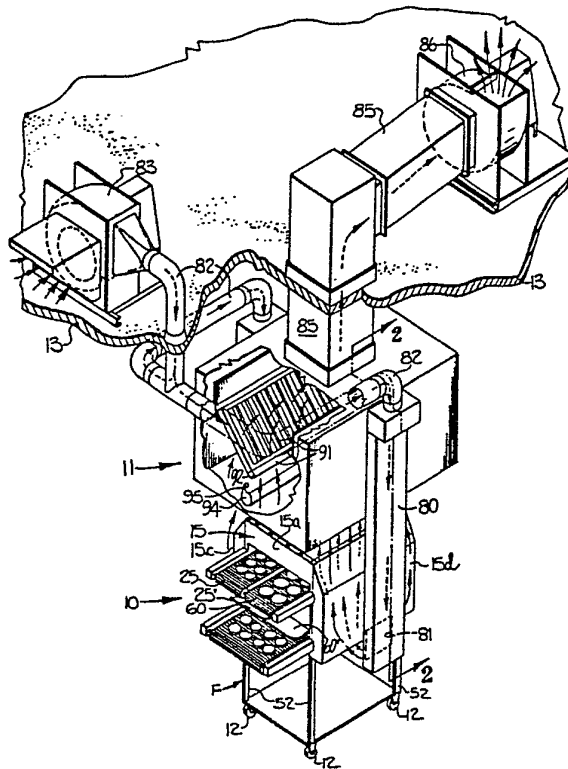


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(54) Title: COOKING APPARATUS



(57) Abstract

A cooking apparatus in which an endless conveyor (25, 25') moving through a heated cooking zone along a closed path of travel having upper and lower runs is cleaned by engagement with a guide (55) which directs the lower run along a sinuous path. The cooking zone is enclosed by a housing (15) having air flow passages (74, 75, 76, 77) which cooperate with a particular air flow circulating arrangement for cooling portions of the apparatus while minimizing loss of conditioned air from the building in which the apparatus is located. Provision is made for accommodating varying usage loads by selection of conveyor speed and heating levels.

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COOKING APPARATUS

Field and Background of Invention

Cooking of foodstuff such as meat patties or hamburgers by conveyor cooking apparatus has been known heretofore and such apparatus have achieved some commercial acceptance. As such apparatus have come into use, however, certain difficulties have been encountered and have posed problems for potential users, particularly in fast service restaurant or food stores.

Most successful fast service restaurant locations do a high volume of business, often concentrated into certain specific times of day. With such high volumes, it is important to an operator that cooking apparatus used be relatively clean and easily cleanable in order to facilitate maintenance of necessary sanitation standards with minimum down-time and operator effort. Ideally, cooking apparatus would be completely self-cleaning.

Another desirable characteristic for conveyor cooking apparatus used in fast service restaurants is adaptability to changing conditions of load. More particularly, concentration of high volume of business into certain parts of a day leaves other parts of a day with substantially lower business volume. Desirably, cooking



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can be efficiently accomplished during both high and low volume time intervals.

Fast service restaurants doing high volumes of business typically are provided with air handling systems which provide for customer areas, heated air during colder seasons and cooled air during hotter seasons. Such conditioned air represents an energy consumption factor in the operation of such a restaurant, and efficient operation calls for minimizing loss of conditioned air. However, such minimization of air loss must be reconciled with the needs for cooling any cooking apparatus used and removing any cooking odors and/or effluent created.



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Summary of Invention

With the above discussion in mind, this invention is characterized by providing a cooking apparatus of the conveyor type capable of high productivity while
5 maintaining sanitary conditions. More particularly, a chain conveyor moved along a path of travel including an upper run along which foodstuff is conveyed for cooking and a lower, return run is engaged by a cleaning means which flexes the conveyor along a sinuous, undulating path to facilitate removal of any adhering
10 foodstuff therefrom.

The present invention is a cooking apparatus comprising a housing for enclosing a cooking zone, an endless foodstuff conveyor mounted to extend through
15 the cooking zone and for movement along a closed path of travel having upper and lower runs, heating means mounted in the housing for heating the cooking zone and for cooking foodstuff conveyed therethrough along the upper run of the conveyor, and conveyor cleaning means
20 mounted in the housing for engaging the conveyor along the lower run and for guiding the engaged conveyor in a sinuous path for facilitating dislodging therefrom any adhering foodstuff.

The invention also may be characterized as
25 a cooking apparatus comprising a housing for enclosing a cooking zone, heating means mounted in the housing for heating the cooking zone and for cooking foodstuff disposed therein, and a hood for delivering closely adjacent the housing and for exhausting from above the
30 housing substantially equal volumes of supply and exhaust air.

Some of the characteristics of the invention having been stated, others will appear as the description proceeds, when taken in connection with the accompanying
35 drawings, in which --



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Brief Description of the Drawings

Figure 1 is a perspective view of the improved cooking apparatus of this invention with portions of the hood means thereof broken away;

Figure 2 is an enlarged transverse vertical sectional view taken looking forwardly substantially along line 2-2 in Figure 1;

Figure 3 is a further enlarged, somewhat schematic, longitudinal vertical sectional view taken substantially along line 3-3 in Figure 2;

Figure 4 is an exit or front end elevational view looking generally at the right-hand side of Figure 3, but being on a reduced scale;

Figure 5 is an enlarged sectional plan view taken substantially along line 5-5 in Figure 4, with portions broken away;

Figure 6 is a fragmentary view of a preferred form of conveyor chain utilized in the apparatus; and

Figure 7 is an elevation of a suitable control panel for certain electrical components of the apparatus.



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Detailed Description

Referring more specifically to the drawings, with particular reference to Figures 1, 2 and 4, the improved cooking apparatus of this invention comprises

5 a cooking unit 10 and a hood or air circulating unit 11 cooperatively arranged so that the air circulating unit 11 may circulate air past the cooking unit while the apparatus is in use and the units 10, 11 may be readily separated to position them remote from each other, if

10 desired, during a general cleaning of the apparatus. To this end, the frame F of the cooking unit 10 may be mounted on suitable wheels 12, and the air circulating unit 11 may be stationarily supported, preferably by being suitably suspended from an adjacent ceiling or

15 roof 13 of the room.

The cooking unit 10 comprises housing means 15 including rear and front, substantially vertically disposed, spaced apart end walls 15a, 15b and spaced left-hand and right-hand side walls 15c, 15d cooperating

20 with the end walls 15a, 15b for enclosing a cooking zone. As best shown in Figure 3, the rear and front end walls 15a, 15b define respective pairs of upper and lower exit and entrance openings 20, 20a and 21, 21a. The upper entrance and exit openings 20, 21 represent

25 the rear and front ends of the broiler section or tunnel of the apparatus, and the lower entrance and exit openings 20a, 21a represent the rear and front ends of a toaster section or tunnel of the apparatus, such sections or tunnels together constituting the cook-

30 ing zone enclosed by the housing means 15. The aforementioned broiler and toaster sections or tunnels are located one above the other and are provided with respective endless foodstuff conveyor means mounted to



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extend through the cooking zone and for movement along respective closed paths of travel and having upper and lower runs.

Such conveyor means is embodied herein in the form of first and second endless broiler conveyor chains or chain members 25, 25' arranged in side-by-side or coaxial relationship and extending entirely through and outwardly of the entrance and exit openings 20, 21 of the upper or broiler section of the apparatus. The conveyor means is further embodied herein in the form of a single endless toaster conveyor chain or chain member 26 which is spaced below the endless broiler conveyor chains 25, 25' and extends throughout the length of and outwardly of the entrance and exit openings 20a, 21a of the lower or toaster section of the apparatus. Each endless conveyor chain 25, 25', 26 is of a type known as an open-work conveyor and is formed of a series of interconnected widthwise bar links such as are indicated at 27 in Figure 6.

The conveyor chains 25, 25', 26 are each entrained about pairs of rear and front sprocket wheels 31, 32, respectively. The upper and lower rear sprocket wheels 31 for the corresponding conveyor chains 25, 25' and 26 are rotatably mounted on respective upper and lower shafts 34 suitably adjustable forwardly and rearwardly in cantilever arms 35 carried by the frame F of the cooking unit 10. The front sprocket wheels 32 for the lower conveyor 26 are fixedly mounted on a shaft 36 journaled on the frame F and being driven by a suitable variable speed motive means, preferably and electric motor 37, through intervening drive connections 38 (Figure 4).

As shown in Figures 2 and 3, the broiler conveyor chains 25, 25' have substantially common turning



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locations and substantially horizontally aligned upper runs. Also, it is preferred that one of the upper or broiler conveyor chains 25, 25' is narrower than the other upper conveyor chain, particularly for facilitating cooking relatively small and relatively large meat patties at the same time on the two respective broiler conveyor chains 25, 25' during periods of high demand. Accordingly, in this instance, the first conveyor chain 25 is shown in Figures 1, 2, 4 and 5 as being somewhat narrower than the second conveyor chain 25', and for purposes of description only, these two conveyor chains 25, 25' may be considered to be twelve inches and fifteen inches wide, respectively. Further, since it is desirable to cook the relatively smaller and thinner meat patties on the first conveyor chain 25 while the relatively larger and thicker meat patties are being cooked on the second conveyor chain 25' during the aforementioned periods of demand, it is desirable that the two broiler conveyor chains 25, 25' not only be arranged so that their speeds may be varied independently of each other, but it is also desirable that one of the broiler conveyor chains; i.e., the narrower conveyor chain 25 in this instance, be arranged so as to be moved at a relatively faster speed than the other broiler conveyor chain 25'. Accordingly, as shown in Figure 5, the two front sprocket wheels 32 for the first endless conveyor chain 25 are mounted on a different shaft from that on which the two front sprocket wheels 32 for the second endless conveyor chain 25' are mounted. More particularly, as shown in Figure 5, the two front sprocket wheels 32 for the first endless conveyor chain 25 are fixedly mounted on a tubular shaft 40 coaxially of and positioned on an elongate shaft 40' on which the two



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front sprocket wheels 32 of the second endless conveyor chain 25' are fixedly mounted. The shafts 40, 40' are thus rotatable relative to each other. These shafts 40, 40' are mounted in suitable bearings carried by the frame
5 F of the cooking unit 10.

The shafts 40, 40' project outwardly away from the distal sides of the endless conveyor chains 25, 25' and have respective drive connections 41, 41', such as sprocket wheels and chains, connecting the same
10 to respective variable speed motive means or electric motors 42, 42' (Figure 4). The electric motors 37, 42, 42' for the respective conveyor chains 26, 25, 25' are controlled by respective switches 26a, 25a, 25a' and rheostats 26b, 25b, 25b' (Figure 7) mounted on a control
15 panel 43 and being suitably electrically connected to the respective electric motors 37, 42, 42'. Since such electrical connections and any related controls may be readily effected by a skilled electrician, an illustration and a description of such electrical controls and
20 connections is deemed unnecessary. It is apparent, however, that the effective speed of each endless conveyor chain 25, 25', 26 may be selectably varied and may also be readily adjusted relative to the other endless conveyor chains by simply manually adjusting respective rheo-
25 stats 25b, 25b', 26b.

With a view to saving electrical energy at times of relatively low demand for the relatively small and relatively large meat patties, it is to be noted, for example, that the first broiler conveyor chain 25, and
30 corresponding heating means to be later described, may be completely shut off, and by manually adjusting the rheostat 25b', the speed of the fifteen-inch endless



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conveyor chain 25' may be relatively increased at such times that relatively small, thin meat patties are being carried thereby through the cooking zone, as compared to the speed at which the fifteen-inch conveyor chain 25' is operated when carrying relatively larger meat patties through the cooking zone.

In this regard, it is contemplated that the control panel 43 of Figure 7 may be suitably marked adjacent the rheostat 25b' so that it may be quickly moved to either of two thusly indicated positions during the passage of the respective relatively small and relatively large meat patties on the fifteen-inch conveyor chain 25' through the cooking zone. Alternatively, it is contemplated that an additional switch and an additional rheostat, similar to the respective switch 25a' and rheostat 25b', may be provided in the electrical circuit to the electric motor 42' which controls the rate of speed of the fifteen-inch conveyor chain 25', and the two switches then may be manually used alternatively for starting and stopping the corresponding endless conveyor chain 25', with the respective rheostats, including rheostat 25b', being preset or pre-adjusted for operating the conveyor chain 25' at two different predetermined speeds simply by selectively operating the corresponding switch 25a' or the alternative switch thereto, as the case may be.

The means for heating the cooking zone in the tunnel through which the upper or broiler conveyor chains 25, 25' extend comprises side-by-side sets of upper and lower, substantially horizontal rows of electrical resistance heating elements 45, 46 and 45', 46' (Figures 2 and 3) positioned above and beneath the substantially straight upper runs of the corresponding endless conveyor



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chains 25, 25'. Stated otherwise, the rows of heating elements 45, 46 constitute a first set and are respectively positioned over and beneath the upper run of the first broiler conveyor chain 25, and the rows of heating elements 45', 46' constitute a second set and are respectively positioned over and beneath the upper run of the second broiler conveyor 25'. Each adjacent pair of heating elements in each upper and lower row may be substantially U-shaped in plan, with the proximal portions of the heating elements in adjacent horizontally opposed rows being supported in suitable cradles c suitably supported between the proximal sides of the first and second broiler conveyor chains 25, 25'.

The major or heating portions of the heating elements 45, 45', 46, 46' are positioned within the cooking zone, but terminal portions of the heating elements extend through the adjacent portions of the opposite side walls 15c, 15d of the housing means 15 and are, therefore, positioned outside the cooking zone. The distal terminal portions of the resistance heating elements 45, 46 and 45', 46' extend into suitable junction boxes 47, 47' containing suitable electrical conductors or wiring for interconnecting corresponding terminal portions of the heating elements and also having suitable conductor means extending therefrom, not shown, for connecting the heating elements 45, 46 to a suitable "On-Off" switch 45a, and for connecting the heating elements 45', 46' to a suitable "On-Off" switch 45a' on the control panel 43 of Figure 7. It is thus apparent that the sets of heating elements 45, 46 and 45', 46', for cooking foodstuff on the respective broiler conveyors 25, 25', may be energized and deenergized selectively and independently of each other by manual operation of the switches 45a, 45a'.



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A suitable heat reflecting member or plate 50 (Figures 2 and 3) is shown positioned over and in closely spaced relation above the upper rows of electrical resistance heating elements 45, 45' to aid in heating the ambient air for cooking the meat patties being advanced on the upper runs of the respective conveyor chains 25, 25'. The reflecting member 50 may rest upon suitable transverse frame members 51 (Figure 3) suitably secured to and extending between upright corner posts 52 of the frame F of the cooking unit 10. In this regard, it will be observed in Figure 1 that the wheels of the frame F are connected to the lower ends of the corner posts 52. Frame members 53, similar to the frame members 51 last described, may be provided for supporting the upper reaches of the broiler conveyor chains 25, 25'.

According to the invention, an improved conveyor cleaning means, broadly designated at 55 in Figure 3, is mounted in the housing means 15 for engaging the conveyor means embodied in each of the broiler endless conveyor chains 25, 25', along the lower runs thereof, and for guiding the engaged lower runs in a sinuous or undulating path to facilitate dislodging therefrom any adhering foodstuff. As shown in Figure 2, the cleaning means 55 comprises two side-by-side sets of a plurality of generally cylindrical members 55a (Figure 3), which may be in the form of tubular members, bars or rods, and which are mounted in the housing so as to extend generally parallel to one another in a generally horizontal array underlying the lower run of each of the two side-by-side conveyor chains 25, 25' (see Figure 2).

Conveniently, each set of the generally cylindrical members 55a may be arranged in alternately spaced relation in the form of two superposed rows of such elements arranged in spaced relation as shown in Figure 3, with each of the opposite ends of the cylindrical members 55a in such two rows being secured to a



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common bar or frame member 55b. In this way, the bottommost of the two rows of cylindrical members 55a may rest upon a suitable support frame means 55c carried by the frame F of the cooking unit 10 and, when desired, each entire set of the cylindrical members 55a may be inverted to perform its intended function when again positioned on the supporting frame means 55c.

It should be noted that the cleaning means 55 is positioned beneath the lower rows of heating elements 46, 46' (Figures 2 and 3) for the respective first and second broiler conveyor chains 25, 25' so that the lower runs of such chains are undulated and rub against the corresponding generally cylindrical members 55a while passing beneath the heating elements 46, 46' and so that foodstuff adhering thereto may be charred and easily fragmented as the corresponding lower runs of the endless conveyor chains 25, 25' are sliding against and being moved in an undulating path by the corresponding generally cylindrical members 55a of the cleaning means 55. Thus, the charred foodstuff is more readily dislodged from the link bars of the conveyor chains 25, 25' and will fall between the cylindrical members 55a to be collected upon a suitable forwardly and downwardly inclined collecting tray 57.

As is well known, in the preparation of hamburgers and the like, the buns for the hamburgers are toasted and they are usually cut in half before being toasted, with one-half of each bun usually being thicker than the other half of the corresponding bun. Therefore, it will be observed in Figures 2 and 3 that two side-by-side forwardly and rearwardly extending heated toaster platens 60, 60' are provided which are mounted



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for individual vertical or up-and-down adjustment above the toaster conveyor chain 26 by means of threaded rods 61 thereon which extend upwardly and threadedly penetrate nuts 61a carried by the frame F of the cooking unit 10.

5 The electrically heated platens 60, 60' are electrically connected, through junction boxes 62, 62' (Figure 2), to respective "On-Off" switches 60a, 60a' mounted on the control panel 43 of Figure 7. Further, the electrically heated toaster platens 60, 60' are electrically connected
10 to a suitable rheostat 64 carried by the control panel 43 of Figure 7 and which may be suitably manually adjusted for selectively establishing the temperature of the lower surfaces of the toaster platens 60, 60'. The junction boxes 62, 62' may be suitably secured to the frame F and
15 are shown positioned beneath the junction boxes 47, 47', respectively, in Figure 2. A suitable catch tray 65 (Figures 2, 3 and 4) for bread crumbs and the like is suitably supported beneath the endless toaster conveyor chain 26 by the frame F of the cooking unit 10.

20 It is to be noted that the tray 65 extends forwardly a sufficient distance beyond the front portion of the toaster endless conveyor chain 26 so that successive toasted buns are discharged from the forward portion of the toaster conveyor chain 26 onto the tray 65. The
25 front corner posts 52 of the frame F of the cooking unit 10 also support a suitable holding tray 67 which extends beneath and forwardly beyond the front portions of the endless broiler conveyor chains 25, 25a for receiving the successive cooked meat patties or other food-
30 stuff discharged off the front end portions of the latter conveyor chains. It is preferred that the bottom of the holding tray 67 is perforated and suitably



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removably supported upon a suitable reservoir 70 for catching any grease or foodstuff which may be dislodged from or drip from the cooked meat patties.

It is desirable to not only direct unwanted
5 heated ambient air away from the entrance and exit openings 20, 21 of the housing means 15 of the cooking unit 10, but it is also desirable to dissipate excessive heat away from the walls of the housing means, and it is particularly desirable to direct heated air away from
10 the terminal portions of the electrical resistance heating elements 45, 46, 45', 46' to aid in preventing charring of the electrical conductors in the vicinity of the terminal portions of the electrical resistance heating elements to thereby prolong the useful life of such
15 electrical conductors. Therefore, the upper portions of the front and rear walls 15a, 15b, as well as at least the major portions of the opposing side walls 15d, 15c, of the housing means 15 are of built-up construction to define respective generally vertically extending air
20 flow passages 74, 75, 76, 77 therein which are open at their bottom and top portions for the flow of air upwardly therethrough. It will be observed in Figure 3 that the open bottoms of the passages 74, 75 in the front and rear walls 15a, 15b are located closely above the
25 broiler conveyor chains 25, 25' adjacent the rear and front ends of the cooking zone. Further, it will be observed in Figure 2 that the passages 76, 77 serve as enclosures within which are positioned the respective junction boxes 47, 47' for the terminal ends of the
30 electrical resistance heating elements 45, 46, 45', 46' as well as the junction boxes 62, 62'.

The hood means 11 is provided for delivering closely adjacent the housing means 15 and for exhausting



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from above the housing means substantially equal volumes of supply and exhaust air. More particularly it will be observed in Figure 2 that the hood means 11 is in the form of a canopy of generally rectangular configuration and has an open bottom with a pair of laterally opposed depending supply ducts 80, 80' thereon, constituting supply duct means, and being positioned so that they straddle medial portions of the housing means 15 in relatively close proximity thereto when the cooking unit 10 occupies an operative position relative to the hood means 11 as shown in Figures 1, 2 and 4.

As preferred, and as is shown in Figure 2, the lower ends of the depending ducts 80 are closed, and the proximal walls of the lower portions thereof are provided with respective louvered openings 81 so positioned as to exhaust so-called make-up air into the open lower ends or bottoms of the passages 76, 77 in the opposite side walls 15c, 15d of the housing means 15. Such make-up air is relatively cool as it is exhausted from the louvered openings 81 and thus the junction boxes 47, 47', 62, 62' are subjected to relatively cool air flowing thereby as it flows upwardly and outwardly through the rather relatively restricted upper ends of the passages 76, 77.

The upper ends of the depending ducts 80 are communicatively connected, via a piping system 82 (Figure 1), to a suitable blower or fan means 83 which may be above the ceiling 13 or on the roof of the room and which receives outside atmospheric air and blows the same into and through the ducts 80 to be exhausted adjacent the lower portions of the housing means 15 in the manner heretofore described. The upper portion of the hood means 11 is communicatively connected, via



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a duct system 85, to the suction side of an exhaust fan or blower 86 (Figure 1) which also may be positioned above the ceiling 13 for exhausting the air drawn into the hood means or canopy 11 outside the building.

- 5 Thus it can be seen that, since the hood means 11 overlies the cooking unit 10 in operative position, the air exhausted from the ducts 80 and the ambient air heated by the cooking unit 10 when in operation is drawn upwardly, as represented by the air flow arrows in
10 Figure 2, and exhausted by the suction fan 86.

Since the air being drawn upwardly from the cooking unit 10 may have substantial amounts of grease suspended therein, in its course through the hood means 11 the air flows through a pair of filters 91 which are
15 inclined downwardly and inwardly toward each other in Figure 2 so that any grease which condenses and collects thereon will flow into a trough 92 extending between opposite side walls of the hood means 11 and having an opening or openings 93 along its lowermost portion for
20 emptying into a suitable catch tray 94 removably suspended, as at 95, within the hood means 11. The filters 91 may be of a well-known type formed of overlapping channel-shaped members with the flanges of alternate such members facing toward the flanges of the intervening
25 of such members. Accordingly, a more detailed description of the filters 91 is deemed unnecessary.

From the foregoing description it can be seen that there is provided a cooking unit 10 and a hood means 11 cooperating therewith for delivering supply
30 air closely adjacent the housing means 15 of the cooking unit and for exhausting a substantially equal volume of air from above the housing means. It can be seen further



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- that the housing means 15 encloses a cooking zone through which endless foodstuff conveyor means is mounted to extend for movement along a closed path of travel and wherein the conveyor chains 25, 25', constituting the
- 5 preferred embodiment of such conveyor means, have upper and lower runs, and heating means 45, 46, 45', 46' are mounted in the housing means 15 for heating the cooking zone and cooking foodstuff being conveyed therethrough along the upper run or upper runs of the conveyor means.
- 10 It can be seen that the invention also provides conveyor cleaning means 55 mounted in the housing means for engaging the conveyor means along the lower run or lower runs thereof and for guiding the engaged conveyor means in a sinuous or undulating path (Figure 3) for
- 15 facilitating dislodging therefrom any adhering foodstuff.

In the drawings and specification, there has been set forth a preferred embodiment of the invention, and although specific terms are employed, they are used in a generic and descriptive sense only and not for

20 purposes of limitation.



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THAT WHICH IS CLAIMED IS:

The embodiment of the invention in which an exclusive property or privilege is claimed as defined as follows:

- 5 1. A cooking apparatus comprising:
 housing means for enclosing a cooking
 zone,
 endless foodstuff conveyor means mounted
 to extend through said cooking zone and for movement along
 a closed path of travel having upper and lower runs,
10 heating means mounted in said housing
 means for heating said cooking zone and for cooking food-
 stuff conveyed therethrough along said upper run of said
 conveyor means, and
 conveyor cleaning means mounted in said
15 housing means for engaging said conveyor means along
 said lower run and for guiding said engaged conveyor
 means in a sinuous path for facilitating dislodging
 therefrom any adhering foodstuff.
- 5 2. Apparatus according to Claim 1 wherein
 said housing means comprises spaced end walls defining
 entrance and exit openings for conveyed foodstuff and
 spaced side walls cooperating with said end walls for
 enclosing said cooking zone, at least certain of said
 walls defining generally vertically extending air flow
 passages for cooling and ventilation of said apparatus.
3. Apparatus according to one of Claims 1 and
 2 wherein said conveyor means comprises first and second
 endless chain members each having widthwise extending
 bar links for supporting foodstuff, and means mounting



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5 said first and second members side-by-side and for driving said first and second members independently one from the other along respective closed paths of travel having common turning locations and substantially horizontally aligned upper runs.

4. Apparatus according to one of Claims 1 and 2 wherein said conveyor means comprises first and second endless chain members each having widthwise extending bar links for supporting foodstuff, and means
5 mounting said first and second members in generally superposed array and for driving said first and second members independently one from the other along respective closed paths of travel having generally superposed, vertically spaced apart, upper runs.

5. Apparatus according to one of Claims 3 and 4 wherein said means for driving said first and second members comprises first and second variable speed means for driving respective one of said members at selectably
5 varied speeds along said closed paths of travel.

6. Apparatus according to Claim 5 wherein at least one of said variable speed means comprises range selection means for selecting one of a high speed and a low speed for the respective one of said members whereby
5 cooking of foodstuff of two predetermined cooking characteristics is facilitated.



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7. Apparatus according to one of Claims 3 and 4 wherein said heating means comprises a plurality of electrical heating elements arranged in first and second sets respectively extending adjacent said first and second members, and switch means electrically connected to said elements for selectively energizing said first and second sets of elements whereby cooking of foodstuff on only one of said members is facilitated.

8. Apparatus according to Claim 1 wherein said conveyor means comprises at least one endless chain member having widthwise extending bar links for supporting foodstuff, and means for driving said chain member at selectably varied speeds along said closed path of travel.

9. Apparatus according to one of Claims 1 and 2 wherein said heating means comprises a plurality of electrical resistance heating elements having terminal portions extending outside said cooking zone and heating portions extending into said cooking zone, and further comprising means for circulating cooling air across said terminal portions.

10. Apparatus according to any of Claims 1 through 9 wherein said cleaning means comprises a plurality of generally cylindrical members mounted in said housing to extend generally parallel one to another in a generally horizontal array underlying said lower run.



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11. A cooking apparatus comprising:
housing means for enclosing a cooking zone,
endless foodstuff conveyor means mounted
to extend through said cooking zone and for movement along
5 a closed path of travel having upper and lower runs,
heating means mounted in said housing means
for heating said cooking zone and for cooking foodstuff
conveyed therethrough along said upper run of said conveyor
means,
10 conveyor cleaning means mounted in said
housing means for engaging said conveyor means along said
lower run and for guiding said engaged conveyor means in
a sinuous path for facilitating dislodging therefrom any
adhering foodstuff, and
15 hood means for delivering closely adjacent
said housing means and for exhausting from above said hous-
ing means substantially equal volumes of supply and exhaust
air.

12. Apparatus according to Claim 11 wherein
said hood means comprises supply duct means depending
adjacent said housing means for delivering supply air
below and ambient to said cooking zone and canopy means
5 overlying said housing means for drawing air ambient to
said cooking zone upwardly.

13. Apparatus according to one of Claims 11
and 12 wherein said housing means comprises spaced end
walls defining entrance and exit openings for conveyed
foodstuff and spaced side walls cooperating with said end
5 walls for enclosing said cooking zone, at least certain
of said walls defining generally vertically extending



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air flow passages for cooling and ventilation of said apparatus by said supply air.

14. Apparatus according to Claim 13 wherein said heating means comprises a plurality of electrical resistance heating elements having heating portions extending into said cooking zone and terminal portions extending outside said cooking zone into said air flow passages for circulation of cooling supply air across said terminal portions.

15. A cooking apparatus comprising:

housing means for enclosing a cooking zone,
heating means mounted in said housing means
for heating said cooking zone and for cooking foodstuff
disposed therein, and

hood means for delivering closely adjacent
said housing means and for exhausting from above said
housing means substantially equal volumes of supply and
exhaust air.



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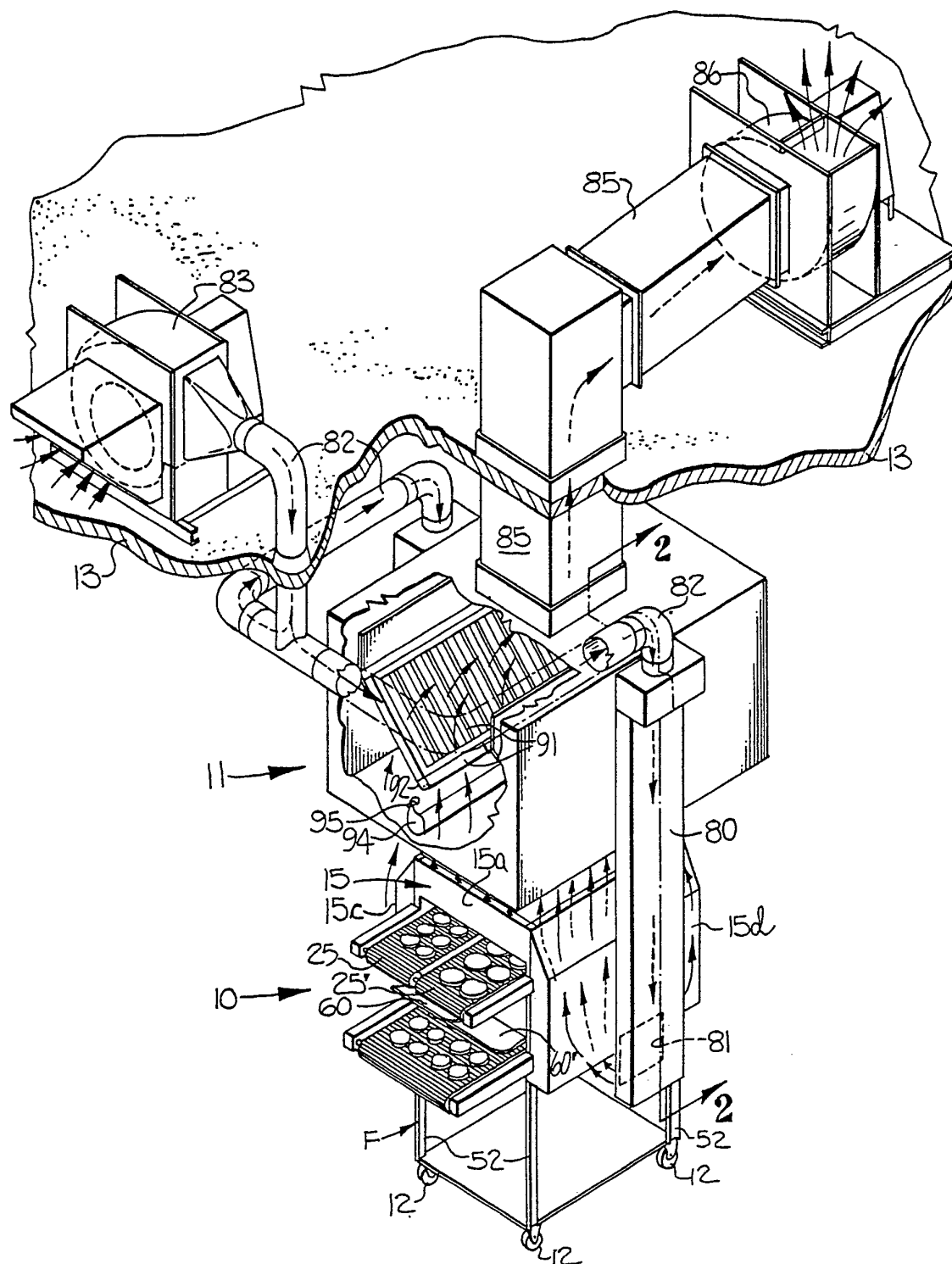
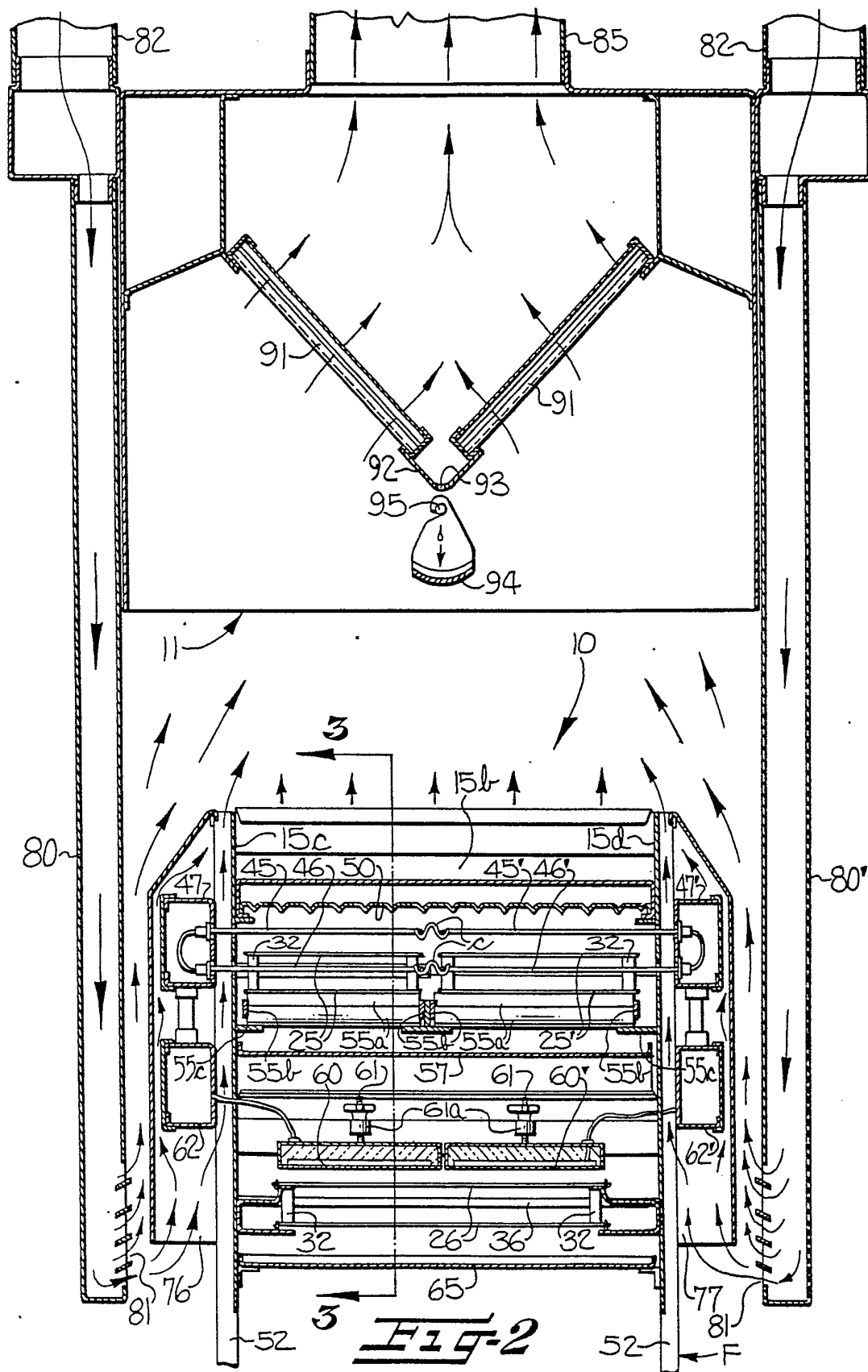
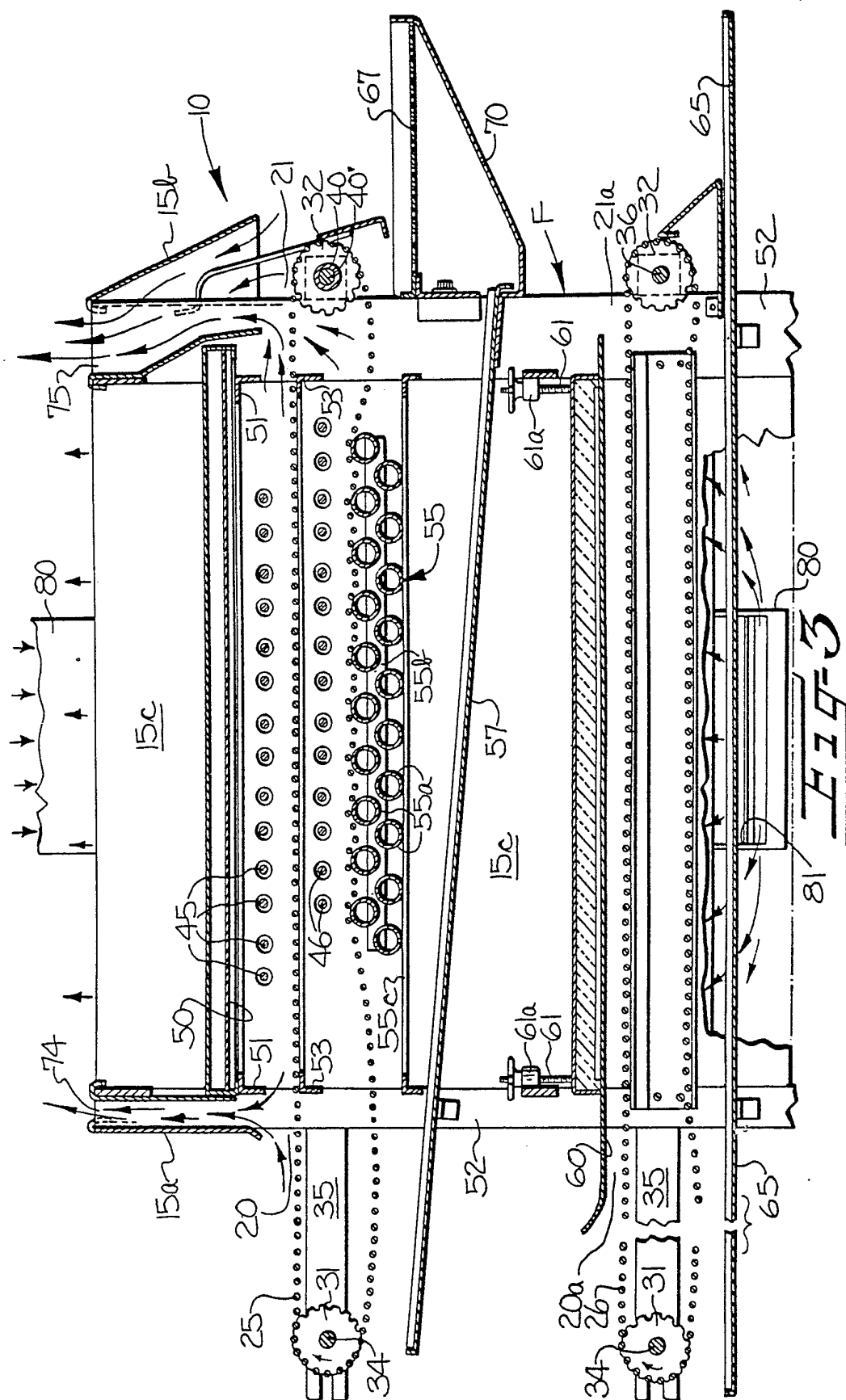


Fig-1

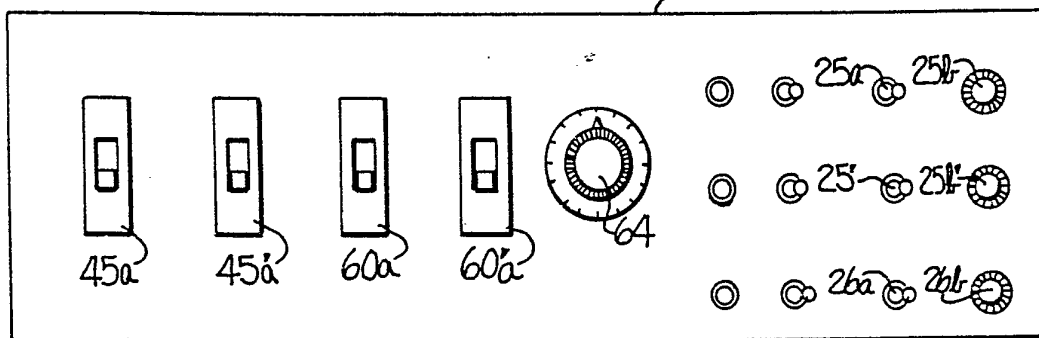
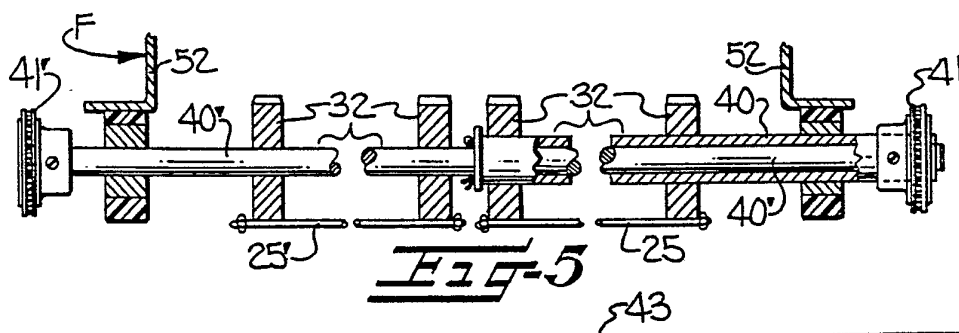
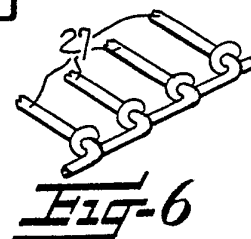
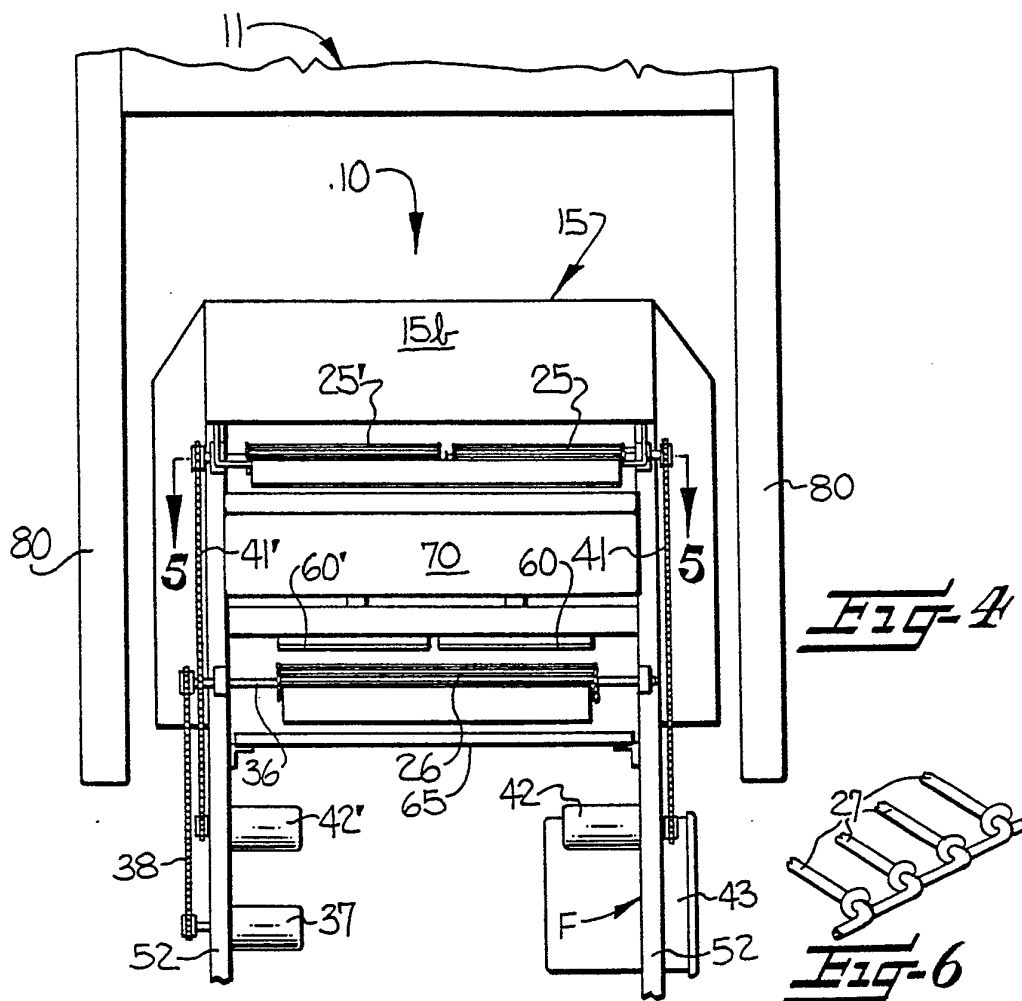
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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US79/00094

W07/00663

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) *		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int. Cl. H05B 1/02; H05B 1/02 ; A47J 27/00; A47J 37/08; A47J37/00; A23L 3/00; A47J 37/12; A23L 3/00 *		
II. FIELDS SEARCHED		
Minimum Documentation Searched *		
Classification System	Classification Symbols	
US	341	386
	349	417
	317	443-G
		497
Documentation Searched other than Minimum Documentation to the extent that such Documents are Included in the Fields Searched *		
III. DOCUMENTS CONSIDERED TO BE RELEVANT ¹⁴		
Category *	Citation of Document, ¹⁶ with indication, where appropriate, of the relevant passages ¹⁷	Relevant to Claim No. ¹⁸
X	US, A3,695,170 Published 03 October 1972	1-15
X	US, A3,611,913 Published 12 October 1971	3-6
X	US, A3,580,164 Published 25 May 1971	7,8
X	US, A4,071,738 Published 31 January 1978	9,10
X	US, A3,372,635 Published 12 March 1968	11,12,13 & 15
X	US, A2,312,339 Published 02 March 1943	12
X	US, A3,797,375 Published 19 March 1974	14
<p>* Special categories of cited documents: ¹⁵</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>"A" document defining the general state of the art</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document cited for special reason other than those referred to in the other categories</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> </div> <div style="width: 45%;"> <p>"P" document published prior to the international filing date but on or after the priority date claimed</p> <p>"T" later document published on or after the international filing date or priority date and not in conflict with the application, but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance</p> </div> </div>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search *	Date of Mailing of this International Search Report *	
13 June 1979	18 JUL 1979	
International Searching Authority ¹	Signature of Authorized Officer ²⁰	
ISA/US	A.O. Henderson	

FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

I. CLASSIFICATION OF SUBJECT MATTER

* U. S. CL. 198/499, 198/497, 126/390,
99/386, 99/341, 99/371, 99/417, 99/443-C,
99/447

V. ☐ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE ¹⁰

This international search report has not been established in respect of certain claims under Article 17(2) (a) for the following reasons:

1. ☐ Claim numbers _____, because they relate to subject matter¹² not required to be searched by this Authority, namely:

2. ☐ Claim numbers _____, because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out¹³, specifically:

VI. ☐ OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING ¹¹

This International Searching Authority found multiple inventions in this international application as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.

2. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:

3. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

Remark on Protest

- ☐ The additional search fees were accompanied by applicant's protest.
☐ No protest accompanied the payment of additional search fees.