Nov. 1, 1932. E. A. ULMANN 1,885,494

EXHAUST BOX

Filed Nov. 29, 1929 5 Sheets-Sheet 1

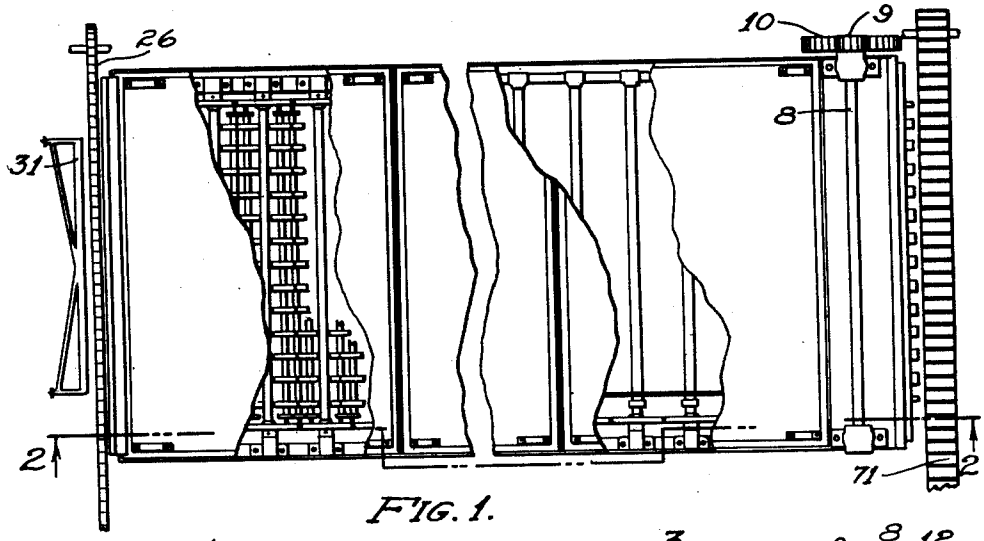



FIG. 1.

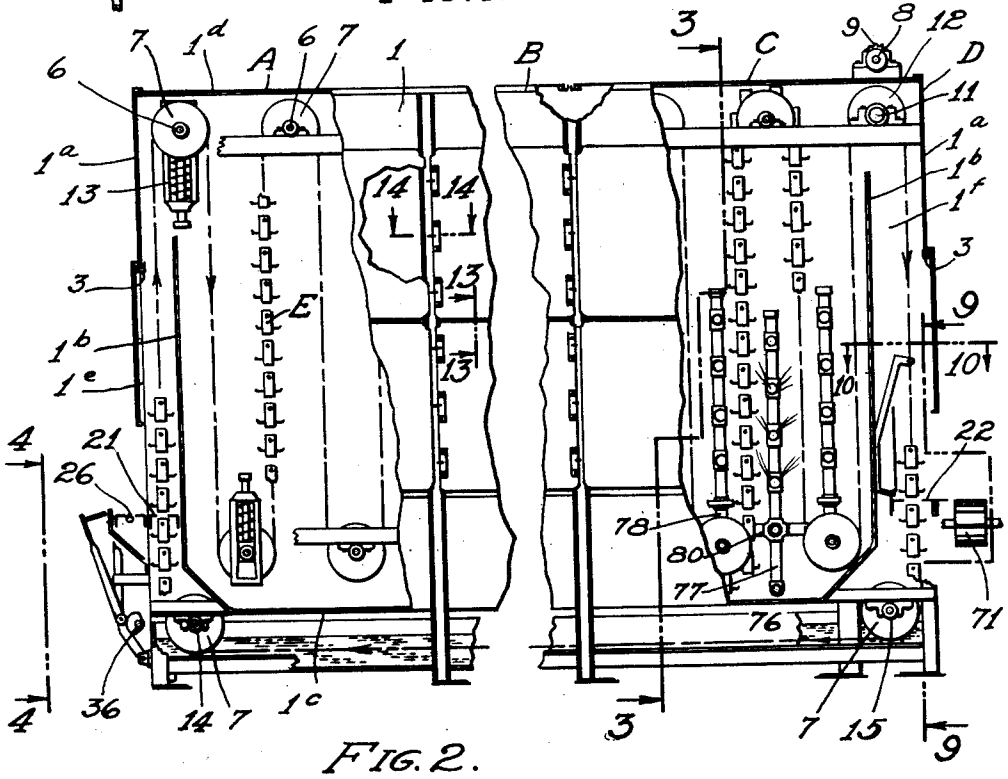



FIG. 2.

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EXHAUST BOX

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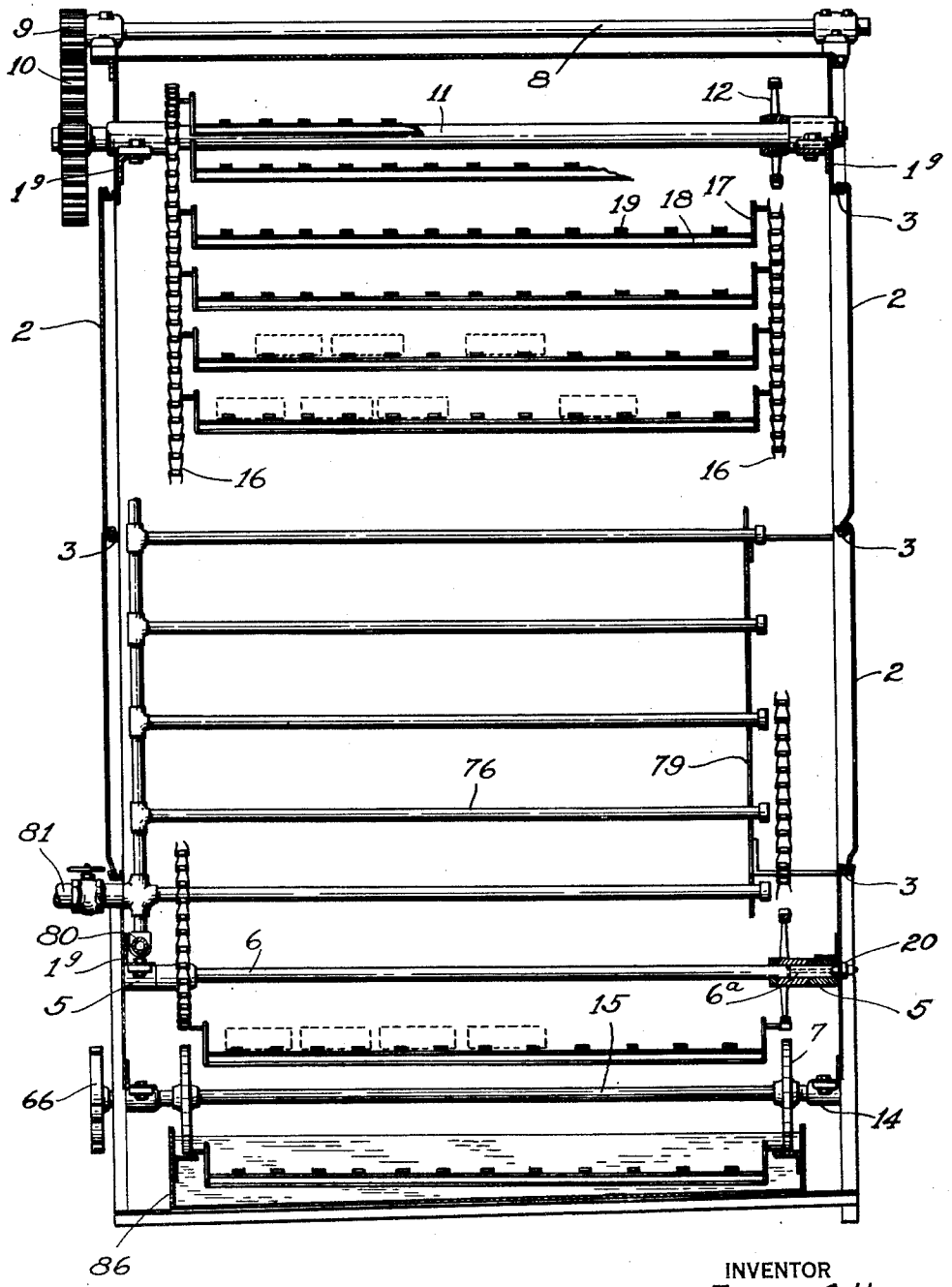



FIG. 3.

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FIG. 4.

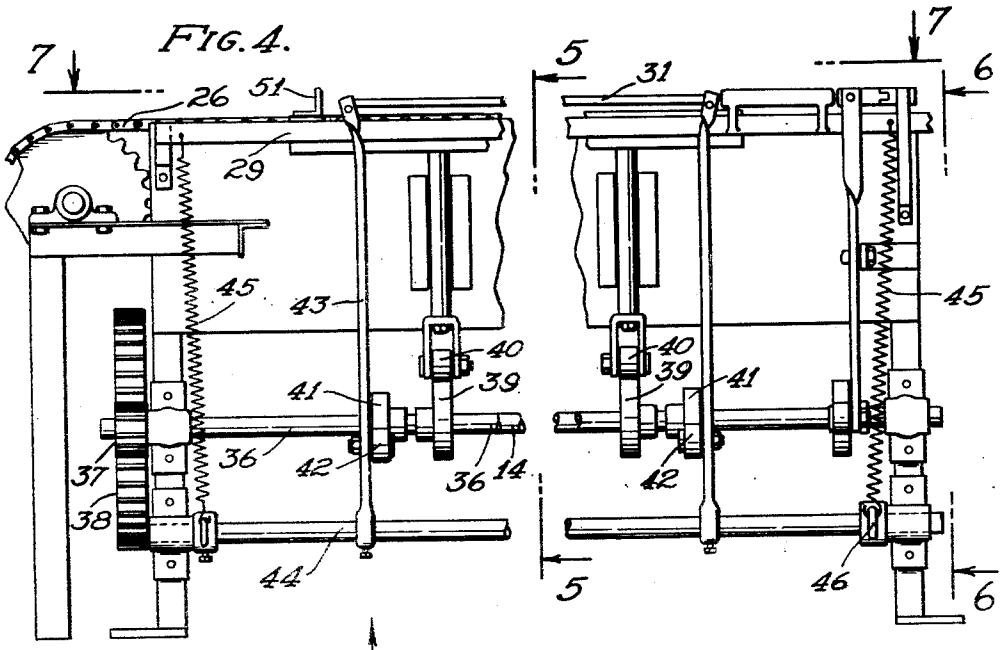



FIG. 5

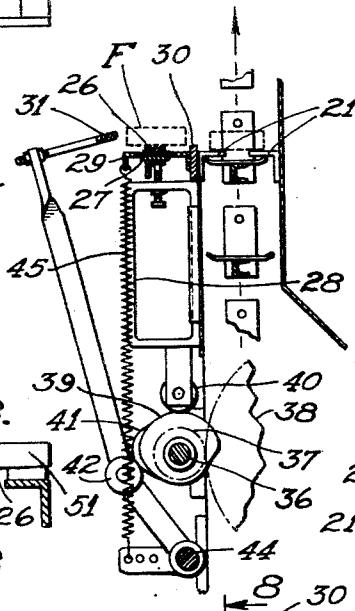



FIG. 6.

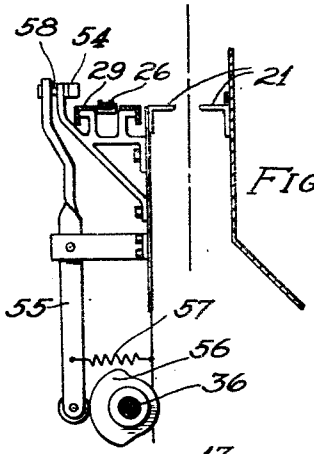



FIG. 8.

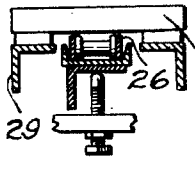
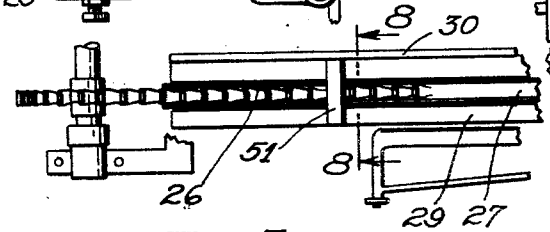
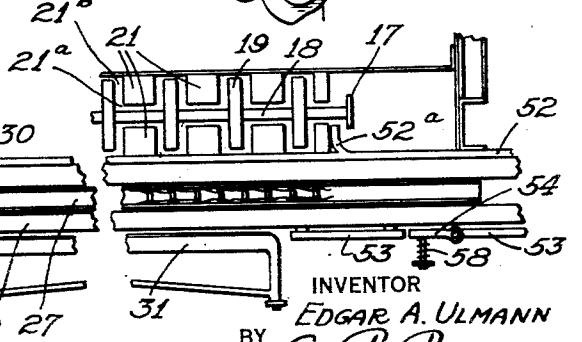



FIG 7.




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FIG. 10

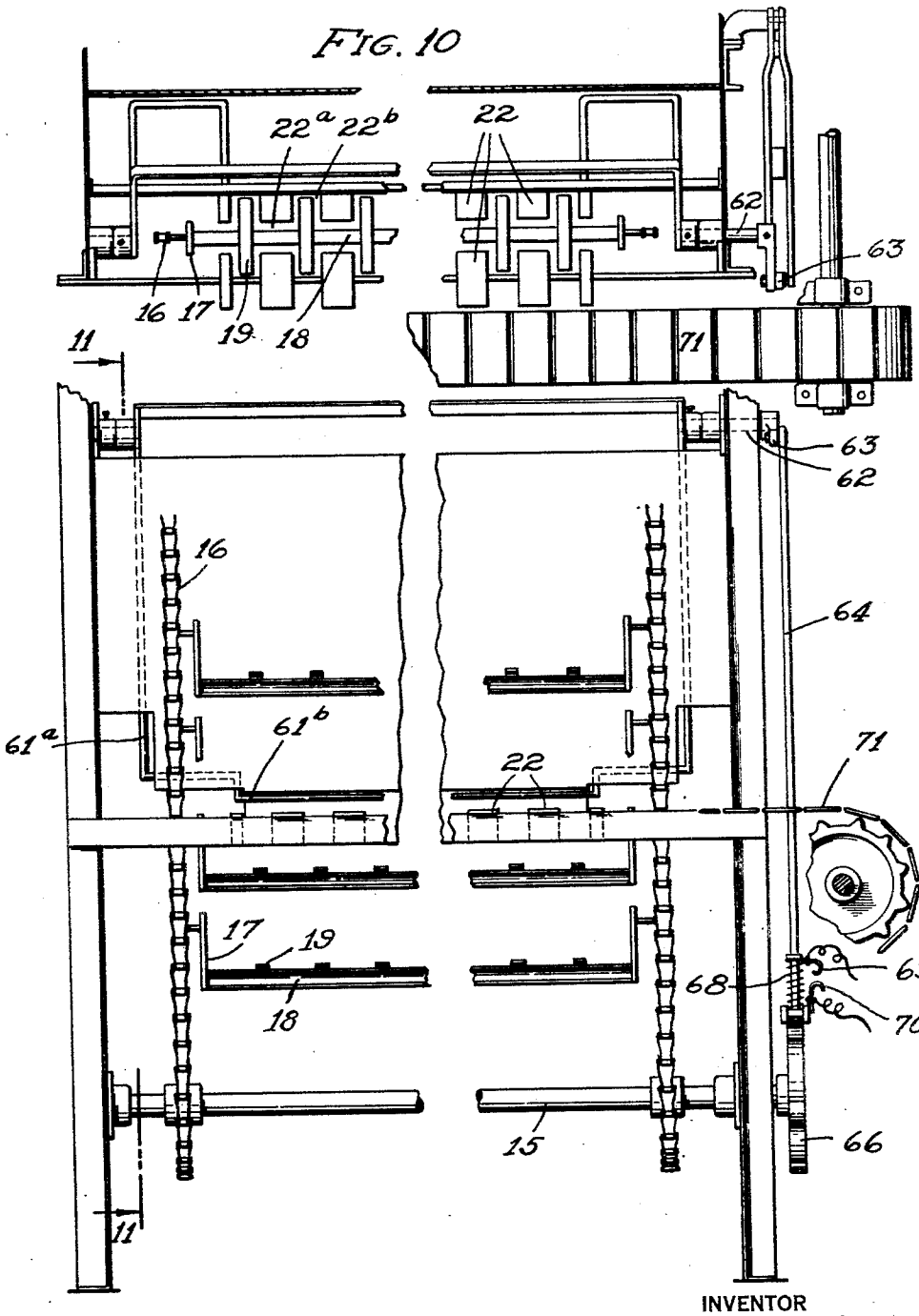



FIG. 9.

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FIG. 11.

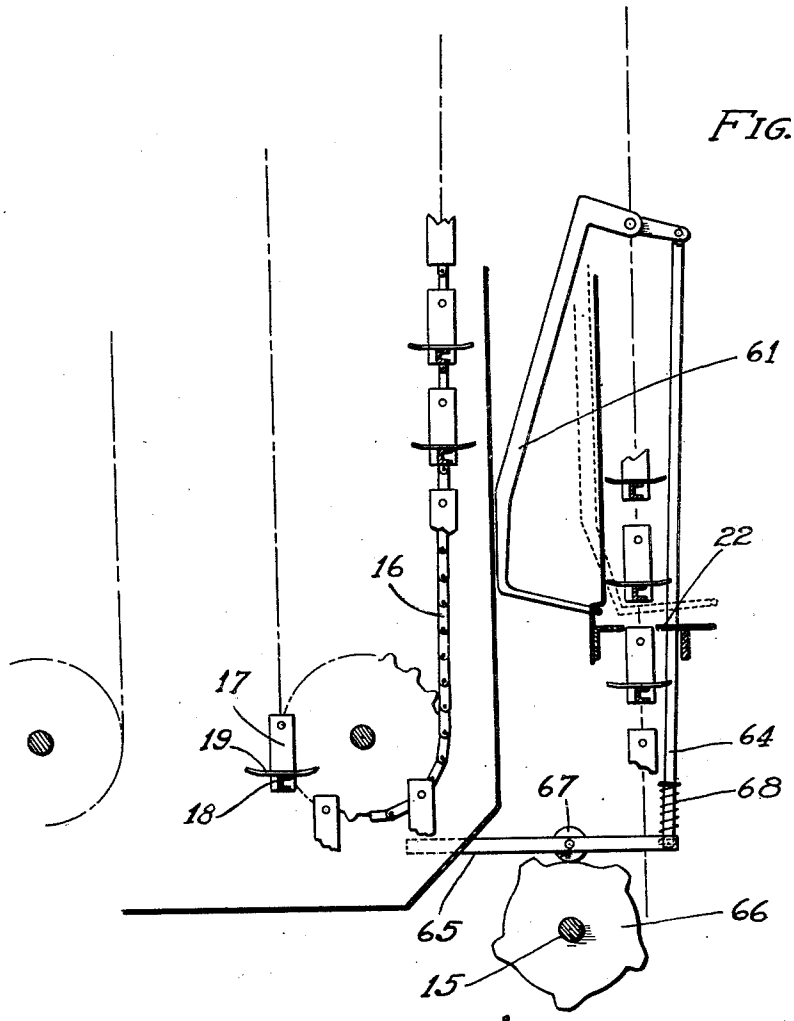



FIG. 12.

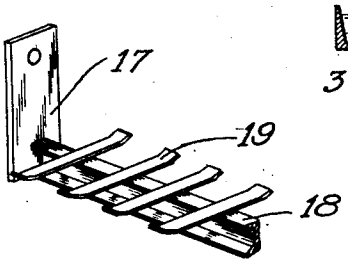



FIG. 13.

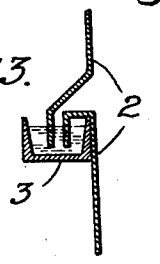
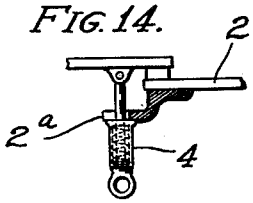



FIG. 14.




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Patented Nov. 1, 1932 1,885,494

# UNITED STATES PATENT OFFICE

EDGAR A. ULMANN, OF LOS ANGELES, CALIFORNIA, ASSIGNOR TO STANDARD BOILER & STEEL WORKS, OF LOS ANGELES, CALIFORNIA

## EXHAUST BOX

Application filed November 29, 1929. Serial No. 410,518.

My invention relates to a continuous cooking and exhausting apparatus, or to an apparatus commercially known as an "exhaust box".

The objects of this invention are: first, to provide an apparatus of this class which is particularly adapted to be used in the canning industry for handling a very large volume of the product in the process of being canned, and in thoroughly cooking the contents of and exhausting the air from a large number of cans, and an apparatus in which a large volume is handled in a relatively small floor space; second, to provide an exhaust box of compact type which may be made in sections so that the same may be extended easily and readily to any desired convenient length for increasing the capacity or increasing the length of time in which the product to be treated is passed through the exhaust box and subjected to the heat therein; third, to provide an exhaust box of this class in which the conveyer carrying the product through the exhaust box or heating chamber therein may be subjected to a washing or cleaning operation after the product has been carried therethrough and before the particular portion of the conveyer again enters the exhaust box or heating chamber therein; fourth, to provide an exhaust box from which the side and top walls are readily removable so that any portion of the interior is readily accessible from the outside; fifth, to provide novelly mounted sprockets for carrying the conveyer through the exhaust box and novel means for lubricating the same from the outside of the exhaust box; sixth, to provide a novelly constructed conveyer for carrying the product through the heating chamber and one whereby the cans are returned in their original positions on the conveying means thoughout the travel through the heating chamber thereby avoiding any possibility of jambing of the cans or of spilling the contents; seventh, to provide a novelly constructed grid for supporting a plurality of articles over substantially the width of the conveyer and through which the conveyer may pass for picking up the articles placed on the grid and in which the articles picked up from the grid extend substantially the full width of the conveyer; eighth, to provide novel means for feeding the articles on to the feed grid; ninth, to provide novel guide means for retaining the articles in alignment and on the feed conveyer until the same are discharged on the feed grid; tenth, to provide a structure of this class in which one of the members of the guide means is removed from the guiding position and in which another guide member discharges the articles on to the feed grid after the former is removed from its guiding position; eleventh, to provide novel means for limiting the number of articles conveyed by the feed conveyer opposite the feed grid so that only the maximum amount of articles may be deposited on the feed grid at one time to be picked up periodically by a conveyer passing through the grid; twelfth, to provide novel means in connection with the feed conveyer for depositing articles carried by the latter on to a fixed supporting means after the articles are conveyed by the feed conveyer opposite another conveyer; thirteenth, to provide a novel discharge grid for periodically receiving articles from a continuous conveyer passing through said grid, and also novel means in association with the grid for receiving the articles periodically deposited thereon; fourteenth, to provide novel means in connection with such discharge grid for periodically discharging the articles therefrom to a conveying means; fifteenth, to provide as a whole a novelly constructed exhaust box; and sixteenth, to provide an apparatus of this class which is simple and economical of construction proportionate to its functions, durable, efficient, easy to operate, and one which will not readily deteriorate, become jambed, or otherwise get out of order.

With these and other objects in view as will appear hereinafter, my invention consists of certain novel features of construction, combination and arrangement of parts and portions as will be hereinafter described in detail and particularly set forth in the appended claims, reference being had to the accompanying drawings and to the characters

of reference thereon which form a part of this application in which:

Figure 1 is a fragmentary plan view of my exhaust box in its preferred form of construction, parts and portions thereof being broken away and in section to facilitate the illustration; Fig. 2 is a fragmentary side elevational view thereof also showing parts and portions thereof broken away and in section to facilitate the illustration; Fig. 3 is an enlarged transverse sectional view thereof taken at 3—3 of Fig. 2, showing parts and portions broken away and in section other than those taken on the section line; Fig. 4 is an enlarged fragmentary front elevational view of the means for feeding the product to the body of the exhaust box; Fig. 5 is a sectional view thereof taken at 5—5 of Fig. 4; Fig. 6 is a fragmentary end elevational view thereof taken at 6—6 of Fig. 4; Fig. 7 is a fragmentary top view thereof taken at 7—7 of Fig. 4; Fig. 8 is an enlarged transverse sectional view taken at 8—8 of Fig. 7; Fig. 9 is an enlarged partial sectional and partial elevational view of my apparatus showing the means for discharging the product from the exhaust box; Fig. 10 is a fragmentary top view thereof taken at 10—10 of Fig. 2; Fig. 11 is a sectional view thereof taken at 11—11 of Fig. 9; Fig. 12 is a fragmentary perspective view of the container carrying rack on the continuous conveyer passing through the exhaust box; Fig. 13 is an enlarged sectional view taken through 13—13 of Fig. 2 showing the sealing means for the removable plates at the side wall of the exhaust box, and Fig. 14, is a fragmentary sectional view on an enlarged scale taken through 14—14 of Fig. 2 showing a means for removably securing the removable plates at the side walls of the exhaust box.

Like characters of reference refer to similar parts and portions throughout the several views of the drawings.

The enclosure, heating chamber or steam chest of my exhaust box, as illustrated in the drawings, is preferably made horizontal and of considerable length and is preferably made of a multiplicity of enclosure sections, designated A, B, C, and D, A being the front section into which the product is fed, B and C being substantially identical intermediate sections, and D being a short section at the rear, unloading, or discharge end of the enclosure. These sections may be made of sheet metal supported by structural steel frames and are made in rectangular form bolted together at their open end forming the complete enclosure, designated 1. The forward side of the section A is provided at its upper portion with an outer wall 1*a* which extends slightly below the middle portion. Inwardly from this wall is another wall 1*b* which extends from the bottom wall 1*c* of the steam chest to near the upper wall 1*d*, and which is spaced from the wall 1*a* a distance slightly greater than the width of the separate racks of the conveyer passing therethrough. The space between the walls 1*a* and 1*b* forms an entrance passage 1*e* and an entrance at the lower edge of the wall 1*a*. At the outer and rear side of the section D is also provided an outer wall 1*a* which extends downwardly beyond the middle portion, and another wall 1*b* inwardly therefrom extending from the bottom 1*c* of the steam chest to near the top thereof. The space between the walls 1*a* and 1*b* in section D forms an exit passage 1*f* having an exit at the lower edge of the wall 1*a*.

The side walls of the sections A, B and C are provided with removable plates 2 which may be conveniently removed for inspection of the steam chest or enclosure 1, or for the repair of parts therein. These plates 2 are provided at their upper edges with inwardly and downwardly turned portions which suspend the upper edges of the plates in and from channels 3 extending longitudinally of the enclosure. The lower edges of the plates also extend into the channels 3, it being noted that the lower edges of the upper plates 2 extend into the same channels from which the lower plates 2 are suspended. These channels are filled with water, or other suitable medium, for forming a seal against the escape of the steam or other heating fluid within the enclosure. The side edges of the plates 2 are secured in position by extensible spring clamps 4, as shown best in Fig. 14. The inner ends of these clamps are pivoted on the frame of the enclosure and when in the plate holding position are extended outwardly over the edges of the plates 2, the clamps extending through slots 2*a* at the side edges of the plates as shown in Figs. 2 and 14.

On the inner side walls of the enclosure, both near the upper and bottom walls thereof, are provided ledges or brackets 1*g* upon which are mounted boxes 5. In these boxes are mounted fixed shafts 6 upon which are rotatably mounted sprockets 7. At the upper side of the rear end of the enclosure is mounted a drive shaft 8 which is geared by reduction gears 9 and 10 to a conveyer drive shaft 11 rotatably mounted within the enclosure near the upper side and rear end thereof. On this drive shaft near the opposite ends thereof are secured drive sprockets 12 which are aligned with the other sprockets 7 and parallel to the axes thereof. At the forward end of the enclosure I have provided adjustable journals 13 for taking up the wear in the conveyer, the journals 13 also carrying shafts 6 on which are mounted sprockets 7. At the forward and rear ends of the enclosure and preferably below the bottom thereof are rotatably mounted other shafts 14 and 15 which are provided near their opposite ends with other sprockets 7. Around all of the sprock-

ets mentioned extends a continuous link belt conveyer E, this conveyer extending from the sprockets 12 downwardly through the passage 1*f*, around the sprockets on the shaft 15, below the bottom of the enclosure, around the sprockets on the shaft 14, upwardly through the passage 1*e*, and thence around alternate sprockets at the upper and lower portions of the enclosure in zigzag manner, and then upwardly at the inner side of the wall 1*b* at the rear end of the enclosure again over the sprockets 12. Thus the conveyer E travels over a great distance within the enclosure and extends therefrom through very narrow passages and thence around the lower side of the enclosure, the shafts 14 and 15 being driven by said conveyer.

The conveyer E consists of a pair of link belts or chains 16 considerably spaced apart and positioned near the opposite sides of the enclosure, and a plurality of racks carried by these chains. The racks referred to above consist of brackets 17 which are suspended at their upper ends from opposed portions on the chains 16, long bars 18 secured at their ends to the lower ends of the brackets 17, and short transverse bars 19 secured at intervals to the upper side of the bars 18. The bars 19 are turned upwardly slightly at their ends for retaining more securely the containers or other articles placed on these racks. Thus, a whole row of containers or other articles, extending substantially from chain to chain, may be carried on each of the racks.

At the forward and rear ends of the enclosure or steam chest are mounted respectively a feed grid 21 and a discharge grid 22, the same being positioned respectively in alignment with the passages 1*e* and 1*f* of the enclosure through which passages the continuous conveyer E passes. Both of the grids are positioned substantially midway between the lower side of the steam chest and the lower edges of the end walls 1*a*. Both of the grids are made substantially alike, that is, both are provided with long openings at their central portions, designated respectively, 21*a* and 22*a*, and multiplicities of transverse openings extending to the opposite sides of the long openings, the transverse openings being designated respectively 21*b* and 22*b*. The long openings of each are adapted to permit the passage therethrough of the long bar 18 of the racks of the continuous conveyer, while the transverse openings in the grids are adapted to permit the passage therethrough of the transverse bars 19 of the continuous conveyer. Thus, when containers of food or the like are placed in a row on the feed grid 21, a rack on the continuous conveyer which next passes through the grid will take up and retain all of the containers on the grid and carry the same slowly through the steam chest; and each rack in turn will pick up other containers on the feed grid. As the racks of the conveyer pass downwardly through the discharge grid, the containers are prevented from continuing in their path by the discharge grid and are therefore deposited on such grid. Each rack in turn deposits its load upon the discharge grid but only after the containers previously discharged thereon have been removed, as will be described hereafter.

The containers or other articles are conveyed to the feed grid by a continuous link belt conveyer 26, as shown best in Figs. 4, 5, 6, 7 and 8. This conveyer is mounted parallel and in spaced relation to the feed grid and is placed with its upper portion on the level with or slightly above the level of the feed grid. The upper portion of the feed conveyer 26 rides in and is supported by a channel 27 which is adapted periodically to be lowered by a frame 28. At the opposite sides of the conveyer supporting channel 27 are fixedly mounted supporting members 29 which are positioned on the level with or slightly above the feed grid 21 and slightly below the uppermost portion of the feed conveyer 26 when the same is in a raised position. Between the inner supporting member 29 and the feed grid 21 is mounted a guide member 30 which, in this instance, is supported by the frame 28 and which is normally positioned above the grid and supporting members 29, as shown in Figs. 5 and 8. At the opposite sides of the feed conveyer 26 and above the outer supporting member 29 is mounted another guide member 31. Both the guide members 30 and 31 retain the containers or other product, designated F on the conveyer and in alignment with each other thereon until the containers are lowered on the supporting member. The guide member 31 is also movable but transversely of the path of the containers and is adapted periodically to remove the containers positioned above the feed conveyer 26 on to the feed grid, but only after the guide member 30 is lowered.

The several movable members above mentioned are operated in synchronism with the continuous conveyer passing through the steam chest, but are operated directly by a cam shaft 36 which is connected by gears 37 and 38 to the shaft 14. On the shaft 36 is mounted a cam 39 which is engaged by a roller 40 carried at the lower end of the frame 28 for raising and lowering the feed conveyer supporting channel 27 and the guide member 30. On the same shaft are mounted other cams 41 which engage rollers 42 carried on pivoted arms 43 which are secured at their lower ends to a rockshaft 44. The upper end of the arms 43 carry the guide member 31 referred to above. The rollers 42 are held yieldably against the cams 41 by long tension springs 45 connected at their upper ends to the main

frame and at their lower ends to short arms 46 on the rockshaft 44. Thus in case of jambing of any of the containers, there will be no positive force exerted against the frame by the guide and feed member 31.

As the containers F are continuously carried along by the feed conveyer 26, the first container engages a stop 51 in the path of the feed conveyer and stops the same short of the corresponding end of the feed grid and short of the corresponding ends of the racks on the conveyer E. Thus, the advance of the container, or product to be passed through the enclosure 1, is checked opposite the entrance opening into such enclosure.

At one end of the guide members 30 and 31 are fixed guide members 52 and 53 which are substantially continuations of the former in the direction of the feed conveyer from whence the containers come. The end of the guide member 52 extending toward the guide member 30 is bent inwardly toward the enclosure inwardly from the supporting brackets 17 of the racks of the conveyer E so that the containers will not interfere with such brackets. In the guide member 53, near the guide member 31, is an opening in which is pivotally mounted a container limiting member 54. This member is adapted periodically to be shifted inwardly into the path of the containers carried by the conveyer 26 so that only a limited number of containers or other articles may pass beyond this member and be placed at one time on the feed grid. This limiting member 54 is forced inwardly by an arm 55 pivotally mounted intermediate its ends and operated by a cam 56 which is also mounted on the shaft 36. The arm is held in engagement with the cam by a spring 57; thus, the arm is moved positively by the cam. The upper end of the arm 55 is, however, yieldably connected to the limiting member 54 by a spring 58.

As the containers, after being passed through the enclosure, are deposited on the discharge grid 22, the same are periodically removed therefrom by a kick-out member 61 which is mounted within the enclosure in the discharge passage and pivotally mounted at its upper end substantially in alignment with the path of the conveyer E passing through the passage. This member 61 consists of a pair of arms 61*a* and a connecting portion 61*b*. The arms 61*a* are pivotally mounted at their upper ends outwardly from the chains of the conveyer E and are connected at their lower ends to the portion 61*b*. The latter portion is offset at its ends so that the ends do not interfere with the chains of the conveyer E while the intermediate portion passes between the chains and between the brackets of the racks for kicking-out the containers deposited on the discharge grid without interfering with the conveyer E.

The upper end of one of the arms 61*a* is secured to a rockshaft 62 which passes through the frame of the enclosure and is provided at its outer end with an operating arm 63. This arm 63 is oscillated in synchronism with the conveyer E by a rod 64 which is raised and lowered by a pivoted arm 65 which arm is periodically oscillated by a cam 66 engaging a roller 67 carried by the arm. The cam 66 is mounted on the shaft 15, as shown in Figs. 9 and 11. The connection between the rod 64 and the arm 65 is of such resiliency that the rod 64 is normally raised when the roller 67 is engaged by the humps on the cam 66, but is adapted to be shifted relative to the rod 64 in case the pick-out member 61 is jambed for any reason. This yieldability is effected by a compression spring 68 between these members. When the spring 68 is compressed, there is provided means for actuating a safety means. In this instance, the safety means may consist of a switch (not shown) for cutting out the electric motor (not shown) which operates the mechanism. This cutout switch may be actuated by a pair of normally spaced apart contacts 69 and 70 carried respectively by the rods 64 and the arm 65. These contacts, shown in Fig. 9, are connected when the spring 68 is compressed beyond a predetermined point.

The interior of the enclosure is heated by steam which is supplied by a large number of steam jets directed upwardly and angularly from a large number of steam pipes 76 extending horizontally across the enclosure between the several sections of the conveyer E. These pipes 76 are supported at one end and supplied by steam from a number of vertical headers 77 and 78, and at the opposite ends by convenient supports 79. The headers 77 and 78 are connected to a main horizontal header 80. The steam to the steam pipes is controlled by a valve 81, as shown in Fig. 3.

At the lower side of the exhaust box and below the steam chest, is provided a large water pan 86 which extends the full length of the enclosure. This water pan is so arranged that the conveyer E and the racks carried thereby pass through water in the water pan for washing the conveyer and racks after the same leave the steam chest and before the same again enter the steam chest for further operation.

When the containers are removed from the discharge grid by the kick-out member 61, the containers are deposited on another continuous conveyer 71 positioned adjacent the discharge grid. From this conveyer, the containers are directed to the location desired for further operation.

The operation of my machine is briefly as follows:

The containers or other product to be treated are supplied by the conveyer 26 in a

continuous stream but the limiting member 54 checks the advance of more containers than can be deposited at one time upon the feed grid. As the first container engages the stop 51, both the feed conveyer carrying channel 27 and the guide member 30 are lowered permitting the conveyer 26 to drop of its own weight and permitting the containers to rest directly upon the supporting member 29. The feed member 31, which previously served as a guide member, is then directed inwardly forcing the containers on to the feed grid from which they are picked up by the rack on the conveyer E, such containers picked up at one time filling substantially the whole of the racks. This operation is continuously repeated without cessation. The advance of the conveyer E through the enclosure or steam chest is so timed that the proper treatment is given the product within the containers passed therethrough. The conveyer E in sequence then deposits the containers from each rack on to the discharge grid 22 from which grid the containers are immediately removed and discharged upon the continuous conveyer 71 by the kick-out member 61.

Though I have shown and described a particular construction, combination and arrangement of parts and portions, I do not wish to be limited to this particular construction, combination and arrangement, but desire to include in the scope of my invention the construction, combination and arrangement substantially as set forth in the appended claims.

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

1. In an apparatus of the class described, an enclosure, a container feed grid mounted at one side of the enclosure and adapted to receive a plurality of containers, a continuous conveyer extending through the enclosure and passing through said grid and adapted to pick up all containers thereon, a feed conveyer at one side of the feed grid for conveying containers thereto, and means timed with the first conveyer for periodically directing the containers from the feed conveyer to the grid.

2. In an apparatus of the class described, an enclosure, a container feed grid mounted at one side of the enclosure and adapted to receive a plurality of containers, a continuous conveyer extending through the enclosure and passing through said grid and adapted to pick up all containers thereon, a feed conveyer at one side of the feed grid for conveying containers thereto, means timed with the first conveyer for periodically directing the containers from the feed conveyer to the grid, and kick-out means timed with the first conveyer for periodically discharging containers deposited on the discharge grid.

3. In an apparatus of the class described, an enclosure, a discharge grid at one side of the enclosure, a continuous conveyer extending through the enclosure and passing through the grid, and kick-out means timed with the conveyer for periodically discharging containers deposited on the discharge grid.

4. In an apparatus of the class described, a feed grid having a continuous long opening therethrough and a plurality of short transverse openings connecting therewith, and a conveyer having a multiplicity of racks extending substantially the full length of the long opening and having transverse supporting portions adapted to pass through the transverse openings in the grid.

5. In an apparatus of the class described, a continuous conveyer comprising a pair of conveyer belts, said belts having pairs of depending supports at their adjacent sides, bars connecting the lower ends of the depending supports, and short transverse bars secured to the long bar in spaced relation to each other.

6. In an apparatus of the class described, a discharge grid having a long continuous opening and transverse openings connected therewith, and a conveyer passing vertically through the grid and provided with a rack adapted to support containers, said rack adapted to pass through the openings in the grid for depositing the container from the conveyer on the grid.

7. In an apparatus of the class described, a feed grid, a feed conveyer mounted adjacent the grid, guide means at the opposite sides of the conveyer, said guide means extending above the conveyer and the grid, and stop means in association with the conveyer and at one end of the grid.

8. In an apparatus of the class described, a feed grid, a feed conveyer mounted adjacent the grid, and guide members at the opposite sides of the conveyer, one guide member separating the conveyer from the grid and the other guide member forming means for feeding articles from the conveyer to the grid.

9. In an apparatus of the class described, a feed grid, a feed conveyer mounted adjacent the feed grid, supporting means at the opposite sides of the conveyer for supporting articles carried by the conveyer, and means for lowering the conveyer below the supporting means whereby the conveyer is free of the articles conveyed thereby.

10. In an apparatus of the class described, a feed grid, a feed conveyer mounted adjacent the feed grid, supporting means at the opposite sides of the conveyer for supporting articles carried by the conveyer, means for lowering the conveyer below the supporting means whereby the conveyer is free of the articles conveyed thereby, and guide members positioned at the opposite sides of the conveyer, one of the guide members separat-

ing the conveyer from the grid and adapted to be lowered with respect to the conveyer and the grid with the lowering of the conveyer.

11. In an apparatus of the class described, a feed grid, a feed conveyer mounted adjacent the feed grid, supporting means at the opposite sides of the conveyer for supporting articles carried by the conveyer, means for lowering the conveyer below the supporting means whereby the conveyer is free of the articles conveyed thereby, and guide members positioned at the opposite sides of the conveyer, one of the guide members separating the conveyer from the gird and adapted to be lowered with respect to the conveyer and the grid with the lowering of the conveyer, the guide member positioned at the opposite side of the conveyer forming means for directing the articles carried by the conveyer on to the grid after the first guide member is lowered.

12. In an apparatus of the class described, an enclosure, a discharge grid at one side and at the outside of the enclosure, a continuous conveyer passing through the enclosure and the grid, conveying means at the side of the grid opposite the enclosure, and means positioned behind the grid for kicking articles, deposited on the grid, from the continuous conveyer to the conveying means.

13. In an exhaust box, an enclosure with downwardly directed entrance and exit openings at its ends, said openings connecting the interior of the enclosure directly with the atmosphere, a continuous conveyer mounted to travel circuitously through said enclosure, through said openings, and from said openings around the enclosure, said conveyer having a multiplicity of supporting racks in spaced relation thereon, and a wash tray at the lower portion of the enclosure through which said conveyer is adapted to pass when traveling around the enclosure from the exit to the entrance opening.

14. In an apparatus of the class described, an enclosure having openings at the lower portions of the opposite end walls and having end walls positioned inwardly from the first mentioned end walls and extending with their upper portions above the openings, and a continuous belt conveyer circuitously mounted within the enclosure and extending substantially vertically through through said openings and substantially vertically downwardly to the bottom of the enclosure and extending below said bottom.

15. In an apparatus of the class described, a sectional enclosure comprising separate sections secured together at their ends for forming a continuous enclosure, a shaft and sprocket mounted in each of the sections, one of the sections having an end wall and an entrance opening therein, and another section having an end wall with an exit opening therein, and a continuous link belt conveyer extending around the sprockets in the several sections and forming a continuous conveyer within the enclosure, a portion of the conveyer extending through the openings and around the enclosure.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, November, 1929.

EDGAR A. ULMANN.