Feb. 27, 1923. 1,447,135

C. A. HOY

APPARATUS FOR TREATING CANNED GOODS

Filed Sept. 16, 1920 5 sheets-sheet 1

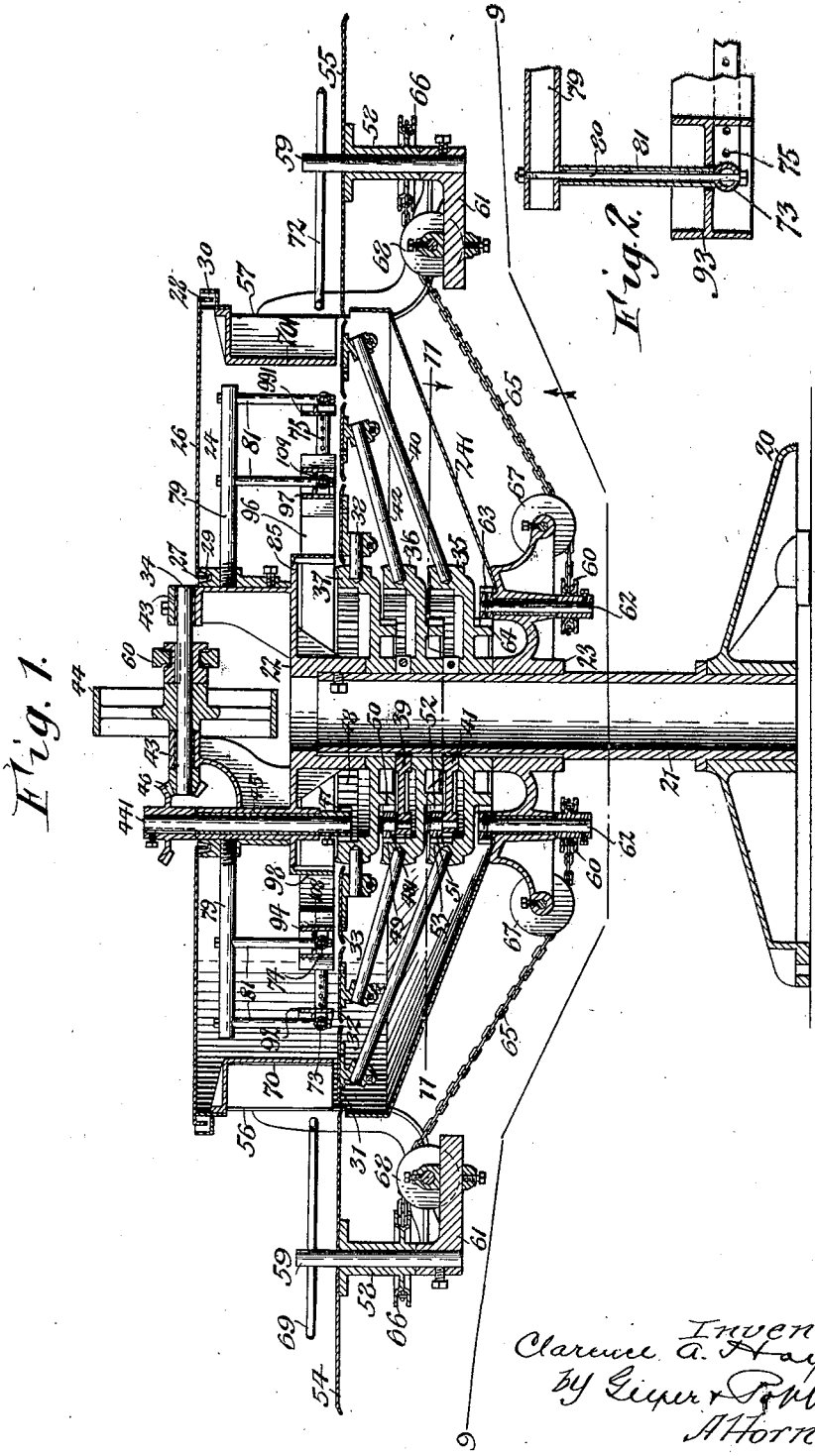


Fig. 1.



Fig. 2.

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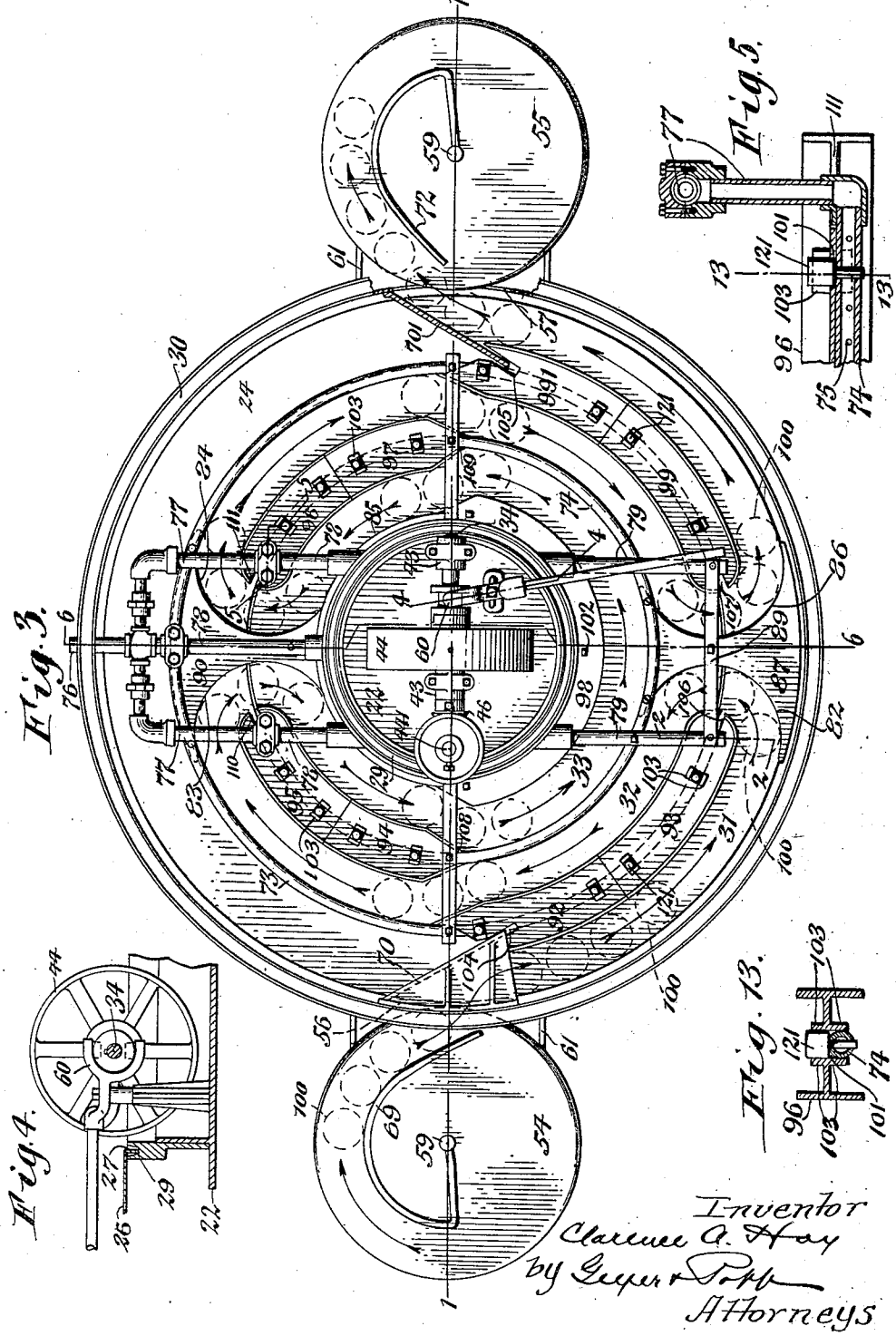


Fig. 3.



Fig. 5.



Fig. 4.



Fig. 13.

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APPARATUS FOR TREATING CANNED GOODS

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Fig. 7.

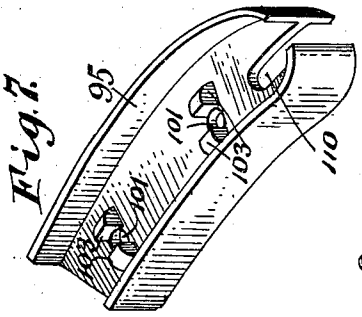



Fig. 8.

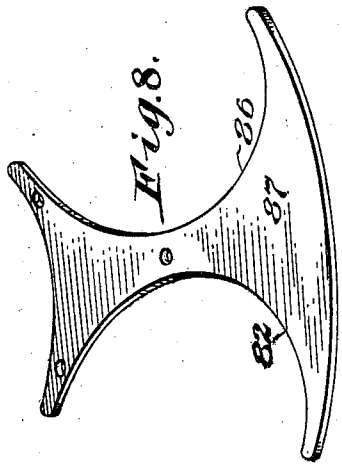
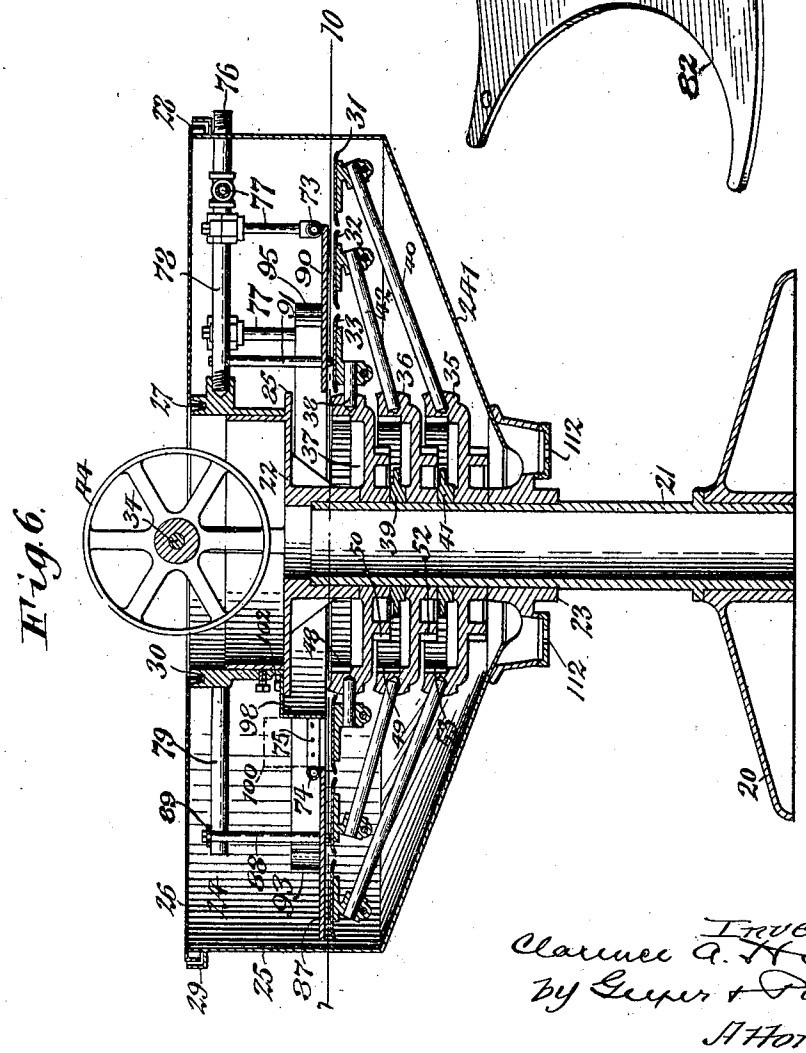



Fig. 6.




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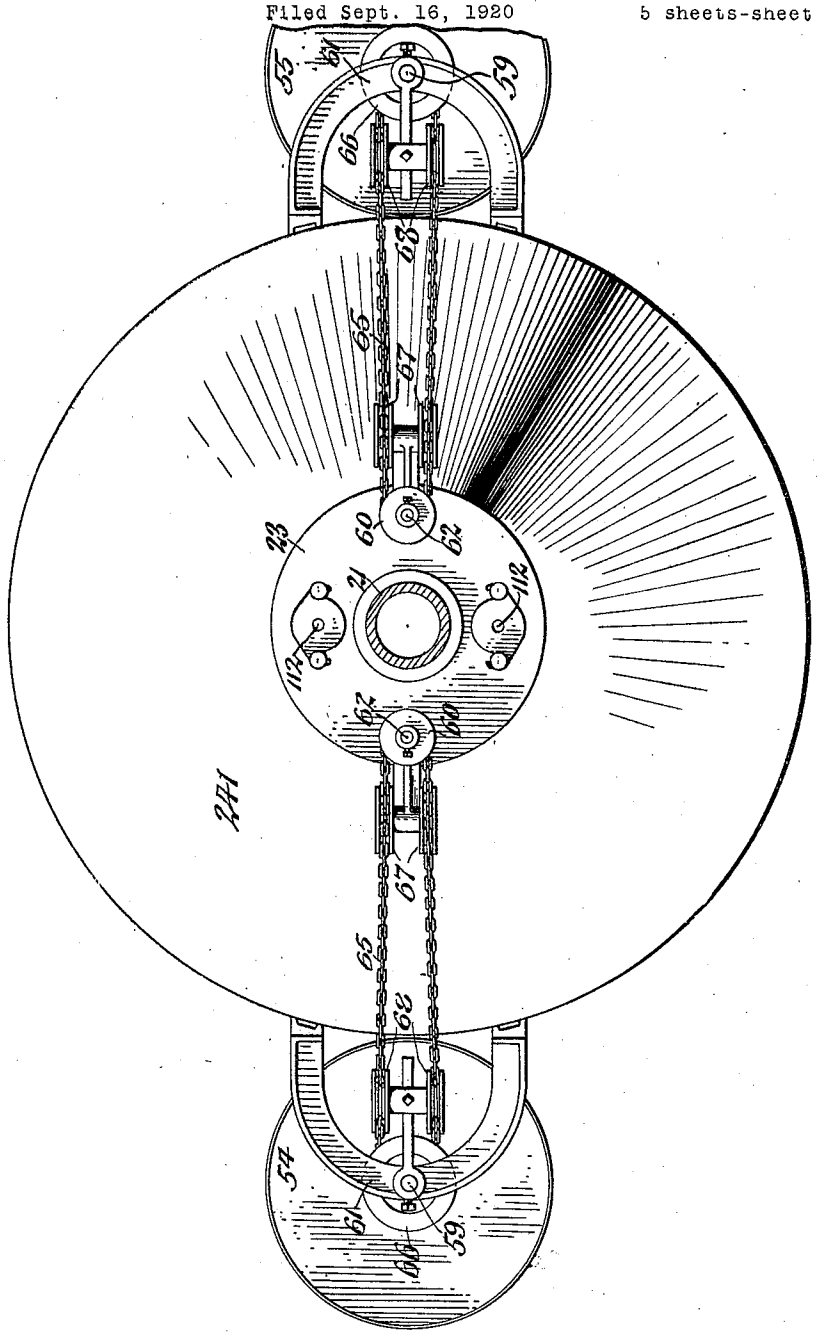



Fig. 9.

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APPARATUS FOR TREATING CANNED GOODS

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Fig. 11.

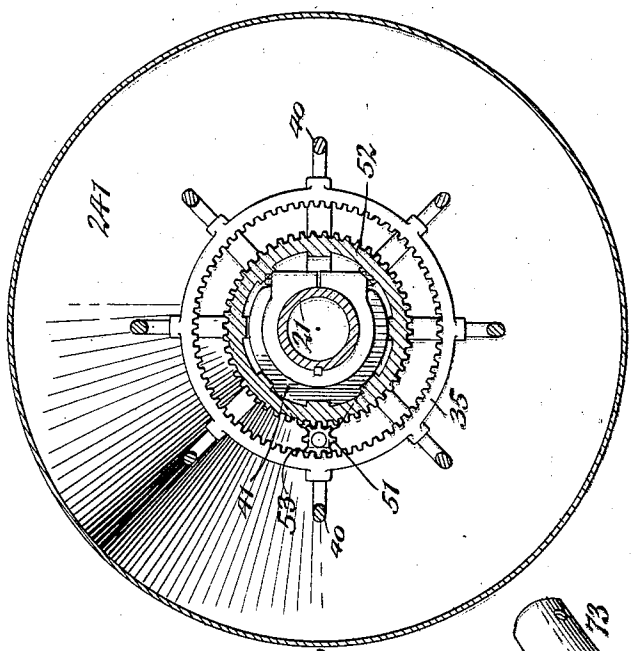



Fig. 12.

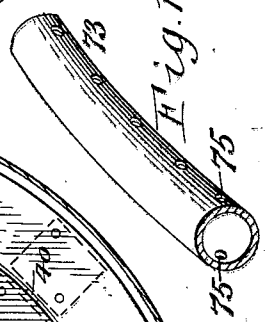



Fig. 10.




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# UNITED STATES PATENT OFFICE.

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## APPARATUS FOR TREATING CANNED GOODS.

Application filed September 16, 1920. Serial No. 410,707.

*To all whom it may concern:*

Be it known that I, CLARENCE A. HOY, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Apparatus for Treating Canned Goods, of which the following is a specification.

This invention relates to an exhauster which is employed in food canning factories for heating the cans while being filled with the goods to be canned and drawing off or exhausting any air that may be present in the cans, so that when the cans are subsequently hermetically sealed the sides and ends of the cans are not liable to bulge out by fermentation within the cans or by the high temperatures to which the same may be exposed when subsequently stored.

It is the object of this invention to produce a machine for this purpose which is compact in construction and capable of handling a comparatively large number of cans in a given time, also to so design the machine that the heating of the cans is effected by a minimum expenditure of steam, also to propel the cans efficiently by the expenditure of a comparatively small amount of power, and to improve the machine in various details as will presently appear.

In the accompanying drawings:

Figure 1 is a vertical longitudinal section of an exhauster embodying my improvements. Figure 2 is a fragmentary vertical section, on an enlarged scale, of the means for supporting the steam pipes and associated parts. Figure 3 is a top plan view of the machine, partly in section, with the cover removed. Figures 4, 5 and 6 are vertical sections taken on the correspondingly numbered lines in Fig. 3. Figures 7 and 8 are perspective views of parts of the means for guiding and reversing the movement of the cans as they pass through the machine. Figures 9, 10 and 11 are horizontal sections taken on the correspondingly numbered lines in Figs. 1 and 6, respectively. Figure 12 is a fragmentary sectional perspective view of one of the steam guiding pipes. Figure 13 is a vertical section taken on line 13—13, Fig. 5.

Similar characters of reference indicate corresponding parts throughout the several views.

The main frame of this machine preferably comprises a circular base 20, a pedestal 21 secured at its lower end to said base, an upper supporting head 22 secured to the top of the pedestal and a lower supporting head 23 secured to the pedestal intermediate of the base and upper head. The treating chamber 24 within which is arranged the principal of the mechanism for propelling the cans while the same are being heated is formed by a downwardly-tapering bottom 241 which is secured at its lower small end to the lower supporting head, an upright cylindrical wall or body 25 rising from the upper outer edge of the bottom, and a horizontal removable ring-shaped cover 26 provided at its inner and outer edges with depending annular flanges 27, 28 which are adapted to dip into water arranged in annular grooves or channels 29, 30 on the upper supporting head and wall and form a steam tight seal therebetween which prevents the escape of any steam from the treating chamber while the cans are passing through the same and being exhausted.

Within the treating chamber and preferably slightly above the lower edge of its cylindrical wall is arranged the rotary conveyer for the cans while the same are being heated, which conveyer in the present instance comprises a plurality of horizontal conveyer rings 31, 32, 33, perferably, though not necessarily, three in number. These rings are of different diameters and nested concentrically one within the other, so that their upper surfaces are flush or nearly so, as shown in Figs. 1 and 6. These several conveyer rings are rotatably supported by a plurality of driving rings 35, 36, 37 arranged in a vertical row and journaled on the periphery of the pedestal. The lowermost driving ring 37 is connected by radial arms 38 with the inner conveyer ring 33 and held against vertical movement between the upper supporting head and an upper stationary collar 39 secured to the pedestal, the lower driving ring 35 is connected by radial arms 40 with the outer conveyer ring 31 and is held against vertical displacement between the lower supporting head and a stationary collar 41 on the pedestal, and the intermediate driving ring 36 is connected by radial arms 42 with the intermediate conveyer ring 32 and is held against vertical movement between the upper and lower collars 39, 41.

34 represents the driving shaft of the machine which is preferably journaled horizontally in bearings 43 on the upper supporting head above the pedestal and provided with a pulley 44 for receiving a driving belt. This driving pulley and shaft may be connected and disconnected by a clutch 60 of any suitable construction for starting and stopping the machine. Motion is transmitted from this driving shaft to the several conveyer rings as follows:

441 represents an upright intermediate shaft journaled in a bearing 45 on the upper supporting head and connected by intermeshing bevel gear wheels 46 with the driving shaft, a gear pinion 47 arranged in the lower end of the upright shaft and meshing with an internal gear 48 on the upper driving ring 37, an upper intermediate gear pinion 481 pivoted on the upper collar 39 and meshing on its outer and inner sides with an internal gear 49 on the intermediate driving ring and an external gear 50 on the upper driving ring, and a lower intermediate gear pinion 51 pivoted on the collar 41 and meshing on its outer and inner sides with an external gear 52 on the intermediate driving ring and an internal driving ring 53 on the lower driving ring. By means of this driving mechanism for the conveyer rings each ring turns constantly in the same direction but opposite to an adjacent ring so that the several rings alternate in the direction of their rotation and the same rotate successively in opposite directions.

In the operation of the machine the cans filled with goods are delivered upon the outer conveyer ring, then successively transferred from the same to the intermediate and inner conveyer rings and back again from the inner ring to the outer ring and discharged from the latter, during which time the cans are alternately conveyed through curved paths in opposite directions on one side of the axis of the machine and then in like manner on the other side of this axis, so that the cans traverse a comparatively long course and are thoroughly heated by steam before being discharged from the machine preparatory to being capped and sealed. The means for feeding the cans to the rotary conveyer rings and discharging the same therefrom are arranged on opposite sides of the machine and are preferably so constructed that the feeding and discharging operations may be effected on either side of the machine and thus permit of reversing the same without any change in structure and adapted the machine readily to different conditions which may be met in places where the same may be installed. For this purpose two rotary tables 54, 55 are provided which for the present will be referred to as the feed table and the delivery table, respectively. These tables are arranged on a level with the conveyer rings and adjacent to diametrically opposite sides of the treating chamber where the latter is provided with inlet and outlet passages 56, 57. Each of these tables is secured to the upper end of a hub or sleeve 58 which is journaled on an upright stationary arbor 59 carried by a bracket 61 on the adjacent part of the wall of the treating chamber. Motion is transmitted from the lower driving ring 35 to each of these tables by means which comprise a lower upright intermediate shaft 62 journaled in a bearing on the lower head 23, a gear pinion 63 arranged on the upper end of the shaft 62 and meshing with an external gear 64 on the lower driving ring, and a belt 65 preferably of the chain type passing with its inner and outer turns around belt pulleys or wheels 60, 66 on the lower end of the shaft 62 and the lower part of the hub or sleeve 58 while the inner parts of its stretches pass around guide wheels 67 on the lower head 23 and the outer parts of its stretches pass around guide wheels 68 on the respective bracket 61, as shown in Figs. 1 and 9. As the cans 100 placed on the feeding table rotate therewith, the same are successively pushed from the edge portion thereof and into the inlet passage 56 of the treating chamber by a curved rake or guide 69 which is secured to the upper end of the respective arbor 59 and upon passing through said inlet, the cans are directed upon the adjacent part of the outer conveyer ring, so that the can moves with the latter in a curved path by an inclined deflector or guide 70 extending obliquely inward and forward from the rear edge of the inlet passage 56 across the adjacent part of the outer conveyer ring. After the cans have been transferred successively from the outer conveyer ring to the intermediate and inner ring and back again to the outer ring, the same are discharged from the outer ring through the outlet of the treating chamber by a deflector or guide 701 extending obliquely inwardly and rearwardly from the front edge of said outlet passage and across the adjacent part of the outer conveyer ring. As the cans issue from the outlet passage of the treating chamber they are delivered upon the delivery table 55 and are directed upon the marginal part thereof by means of a curved rake or guide 72 which is secured to the upper end of the respective arbor 59.

The means whereby the cans are heated and moved from one conveyer ring to another are constructed as follows:

73 represents an outer crescent shaped or curved pipe arranged above the joint beween the outer and intermediate conveyer rings and having its gap on a radial line which is

at right angles to a radial line extending through the inlet and outlet passages of the treating chamber, and 74 is an inner crescent shaped or curved pipe arranged above the joint between the intermediate and inner conveyer rings and having its gap arranged on a radial line which is diametrically opposite the gap in the outer pipe. The pipes 73 and 74 serve the double function of main guides for guiding the cans part of the time in the machine when the largest size of cans is being heated, and also delivering steam into the treating chamber and against the sides of the cans. For this purpose the pipes are provided on their horizontally opposite sides with small openings or perforations 75 so that steam can issue therefrom and strike the cans and steam is supplied to these delivery pipes from a main supply pipe 76 which is connected by branch pipes 77 with the perforated steam delivery pipes. On one side of the machine the branch steam pipes serve to support the steam spray pipes by providing these branch pipes at their inner ends with extensions 78 which are connected with the upper supporting head 22, but at other points around the upper supporting head the spray pipes are additionally supported therein by brackets consisting of horizontal tubular arms 79 projecting laterally from the upper supporting head, suspension rods 80 connecting the horizontal arms with the spray pipes, and spacing sleeves or tubes 81 enclosing the suspension rods and each interposed between the respective spray pipe and the supporting arm above the same, as shown in Figs. 1, 2, 3 and 6. When the largest cans are deposited on the outer conveyer ring at the inlet passage of the treating chamber, the same rotate with this ring and are guided so as to be confined thereon by the cylindrical outer wall 25 of the treating chamber engaging with the outer side of the cans and the outer spray pipe engaging with the inner side of the cans. The latter are thus guided until they reach the gap between the ends of the outer spray pipe at which point the cans are intercepted by a curved reversing guide surface 82 and shifted inwardly from the outer conveyer ring through the outer gap to the intermediate conveyer ring which latter now carries the cans in the opposite direction circumferentially. During this first reverse rotation of the largest cans the same are guided between the adjacent parts of the outer and inner steam spray pipes and this continues until the cans reach the inner gap between the ends of the inner steam spray pipe which is diametrically opposite the outer gap. Upon arriving at this inner gap the cans are intercepted by a curved guide surface 83 which shifts the cans from the intermediate conveyer ring through the inner gap to the inner conveyer, so that the cans are again propelled reversely or in the same direction in which they were first moved by the outer conveyer ring. The cans continue this movement with the inner conveyer ring until the same have nearly completed a circle and have again reached the gap of the inner spray ring when they are intercepted by a curved guide surface 84 and directed from the inner conveyer ring to the oppositely moving intermediate conveyer ring. While traveling with the inner conveyer ring the largest cans are guided on their outer sides by engagement with the inner side of the inner spray pipe while their inner sides engage with an inner circular guide flange 85 which is formed on the upper supporting head 22. The cans now continue their motion under the propulsion of the intermediate conveyer ring until the same have moved circumferentially about one-half a circle and again arrive at the outer gap between the ends of the outer spray pipe at which point they are intercepted by a curved reversing guide surface 86 and directed from the intermediate conveyer ring to the outer conveyer ring and thus caused to again reverse the direction of travel under the influence of the outer conveyer ring. While traveling from the inner gap to the outer gap with the intermediate conveyer ring the largest cans are guided by the opposing sides of the inner and outer spray pipes. The cans now move with the outer conveyer ring until they reach the outlet of the treating chamber where they are deflected from this ring by the guide 701 to the delivery table 55. While traveling from the outer gap to the outlet of the treating chamber, the cans are guided between the outer spray pipe and the outer wall of the treating chamber. The curved guide surfaces 82, 86 are preferably formed on opposite edges of a horizontal plate 87 which is supported by securing its inner end to the adjacent parts of the inner steam spray pipe while its central part is supported by a hanger having an upright rod 88 connected at its lower end with the guide plate and a cross bar 89 connected at its opposite ends with the adjacent supporting rods 79 and at its central part with the upper end of the upright rod 88, as shown in Figs. 3, 6 and 8. The curved guide surfaces 83, 84 are in like manner formed on opposite edges of a horizontal plate 90 which is supported by securing its outer end to the adjacent part of the outer steam spray pipe 73 while its inner end is secured to the lower end of a hanger rod 91 which is secured at its upper end to the adjacent pipe extension 78, as shown in Figs. 3 and 6. As the cans pass through the machine in the manner described, the same take a comparatively long course owing to the zig-zag shape thereof and while thus passing through the treating chamber the steam issuing from the spray

pipes thoroughly heats the cans and their contents and sterilizes the same so that when capped or sealed upon issuing from the machine there is no subsequent liability of bulging, springing or swelling of the cans.

If desired, the operation of the machine may be reversed by turning the parts in a direction opposite from that just described, in which case the cans are fed into the treating chamber through the opening 57 from the adjacent table and discharged through the opening 56 upon the adjacent table, this being accomplished without any change in construction of the machine, thereby enabling the same to be readily installed in places which vary as to conditions of installation. When cans are to be heated or exhausted which are of smaller diameter than the largest cans capable of being handled in the machine, the channels or runways formed between the steam pipes and inner guide flange and outer wall and above the several conveyer rings, are reduced in width to suit the diameter of the smaller cans which are to be operated upon. For this purpose means are provided for reducing the width of the runways to suit the sizes of the cans to be treated, and in the preferred form of the reducing means the same comprise a plurality of sets of detachable and interchangeable reducing guides which are constructed as follows:

92, 93 represent the two sections of a curved auxiliary or reducing guide which are removably and interchangeably mounted on the outer steam pipe between the inlet 56 and the gap between the ends of the outer steam pipe. This reducing guide overhangs or extends laterally and horizontally from opposite sides of the respective part of the outer steam pipe so as to narrow or reduce the width of the respective part of the can channel or runway between the outer steam pipe, the outer wall 25, the curved guide surface 82 and the adjacent part of the inner steam pipe. A similar curved guide consisting of two sections 94, 95 is removably and interchangeably mounted on the inner steam pipe adjacent to one side of the gap between its ends which sections overhang this pipe laterally and horizontally on opposite sides thereof, so as to reduce the width of the passageway or runway between the respective part of the inner steam pipe and adjacent parts of the outer steam pipe, the inner guide flange 85 and the curved guide surface 83. Corresponding curved guide sections 96, 97 are removably and interchangeably mounted on the other end of the inner steam pipe so as to overhang laterally and horizontally therefrom on opposite sides thereof and forming a channel or runway of reduced width between these guide sections and the adjacent parts of the inner and outer steam pipes and the guiding surface 84. Between that part of the inner steam pipe not covered by the reducing guide sections 94, 95 and 96, 97 and the opposing part of the inner guide flange 85, the runway is reduced in width for cans of smaller diameter than the maximum by means of a reducing guide section 98 which is removably and interchangeably secured to the inner guide flange 85. On the opposite end of the outer steam pipe two sections 99 and 991 of a reducing guide are removably and interchangeably mounted so as to horizontally overhang or laterally project from opposite sides of the respective part of this steam pipe and serve to reduce the width of the can runway between the outer steam pipe and the adjacent part of the inner steam pipe and the outer chamber wall, and the guiding surface 86. Each of these removable guide sections is preferably, though not necessarily, made of cast metal. The sections 98 are L-shaped in cross section and secured to the flange 85 by screws 102 or the like. The sections 92, 93, 94, 95, 96, 97, 99, 991 are H-shaped in cross section and have their webs provided with openings or sockets 101 which receive upwardly projecting retaining pins 121 arranged on the upper sides of the steam pipes, the web of each guide section being provided with retaining lugs 103 which engage with opposite sides of each pin 121 and the adjacent part of the respective steam pipe to hold this guide section in place, as shown in Figs. 3, 7 and 13. In addition to this, the guide sections are provided at their outer ends with notches 104, 105 which receive the inner edges of the deflectors 70, 701, the outer ends of the guide sections 93, 99 are provided with notches 106, 107, which receive the adjacent suspension rods 81, 81, the outer ends of the guide sections 97, 97 are provided with notches 108, 109 which receive the adjacent suspension rods 81, 81 and the outer ends of the guide sections 95, 96 are provided with notches 110, 111, which receive the vertical parts of the branches 77, 77 of the pipes leading steam to the inner steam spray pipe.

In practice, a plurality of sets of removable interchangeable reducing guides are provided each set being of a certain size so as to enable the machine to be organized for exhausting cans of a particular size.

It is thus possible by this means to readily and quickly interchange one set of reducing guides for another in order to adapt the machine to the particular size of cans to be treated and by omitting these reducers to fit the machine for treating cans of the largest size capable of being handled by the machine.

In order to dispose of any water of condensation from within the treating cham-

ber, the lower supporting head is provided with drain openings or perforations 112 through which the water may be carried away by any suitable means so as to leave the space below the machine dry.

This machine is very compact in construction and has a large capacity for the amount of space which the same occupies. Furthermore, the same heats the cans very expeditiously and maintains the same at the proper temperature with a minimum expenditure of steam, thereby effecting a considerable economy in the operation of exhausting the cans as compared with the methods heretofore employed for this purpose.

It is to be understood that while the foregoing description refers more particularly to treating goods while the same are packed in cans made of tin that the same is equally useful for treating goods packed in cans, jars, bottles or similar containers or receptacles made of glass, earthenware or other suitable material.

I claim as my invention:

1. An apparatus for treating canned goods comprising a chamber having an inlet and an outlet for the goods, a conveying mechanism arranged within the chamber and having concentric conveyer members which rotate relatively to one another, perforated steam pipes arranged adjacent to said conveyer members and forming part of the means for guiding the goods while on said conveyer members and provided with upwardly projecting retaining pins, and curved guide plates removably mounted on said pipes and provided with openings which receive said pins.

2. An apparatus for treating canned goods comprising a chamber having an inlet and an outlet for the goods, a conveying mechanism arranged within the chamber and having concentric conveyer members which rotate relatively to one another, perforated steam pipes arranged adjacent to said conveyer members and forming part of the means for guiding the goods while on said conveyer members and provided with upwardly projecting retaining pins, and curved guide plates removably mounted on said pipes and provided with openings which receive said pins and with retaining lugs adjacent to said openings which engage with said pins and pipes.

3. An apparatus for treating canned goods comprising a chamber having an inlet and an outlet for the goods, a conveying mechanism arranged within the chamber and having concentric conveyer members which rotate relatively to one another, perforated steam pipes arranged adjacent to said conveyer members and forming part of the means for guiding the goods while on said conveyer members and provided with upwardly projecting pins, vertical members connected at their lower ends with said pipes, and guide plates removably mounted on said pipes and having openings which receive said pins and notches which receive said vertical members.

4. An apparatus for treating canned goods comprising a chamber having an inlet and an outlet for the goods, a conveying mechanism arranged within the chamber and having concentric conveyer members which rotate relatively to one another, perforated steam pipes arranged adjacent to said conveyer members and forming part of the means for guiding the goods while on said conveyer members and provided with upwardly projecting pins, vertical members connected at their lower ends with said pipes, a deflector arranged within said chamber adjacent to the inlet and outlet thereof, and guide plates removably mounted on said pipes and having notches which receive said vertical members and said deflectors.

5. An apparatus for treating canned goods comprising a pedestal, a chamber mounted on said pedestal and having an inlet and an outlet, a conveying mechanism arranged within said chamber and adapted to carry the canned goods in a circuitous course from said inlet to said outlet, comprising a plurality of concentric conveyer rings, a plurality of driving rings rotatably mounted on said pedestal and each supporting one of said conveyer rings, and gearing interposed between said driving rings for producing relative movement of the same and the conveyer rings connected therewith.

6. An apparatus for treating canned goods comprising a pedestal, a chamber mounted on said pedestal and having an inlet and an outlet, a conveying mechanism arranged within said chamber and adapted to carry the canned goods in a circuitous course from said inlet to said outlet comprising a plurality of concentric conveyer rings, a plurality of driving rings rotatably mounted in a vertical row on said pedestal and each provided with arms connected with one of said conveyer rings, and a plurality of gear pinions mounted on said pedestal and each meshing on its opposite sides with an internal gear on one of the driving rings and an external gear on an adjacent driving ring.

7. An apparatus for treating canned goods comprising a pedestal, a chamber mounted on said pedestal and having an inlet and an outlet, a conveying mechanism arranged within said chamber and adapted to carry the canned goods in a circuitous course from said inlet to said outlet comprising a plurality of concentric conveyer rings, a plurality of driving rings rotatably mounted in a vertical row on said pedestal and each provided with arms connected with one of

said conveyer rings, a plurality of gear pinions mounted on said pedestal and each meshing on its opposite sides with an internal gear on one of the driving rings and an external gear on an adjacent driving ring, a horizontal driving shaft mounted on the upper end of said pedestal and an upright shaft mounted on said pedestal and geared at its upper end to said driving shaft and geared at its lower end to the uppermost driving ring.

8. An apparatus for treating canned goods comprising a pedestal, a chamber mounted on said pedestal and having an inlet and an outlet, a conveying mechanism arranged within said chamber and adapted to carry the canned goods in a circuitous course from said inlet to said outlet comprising a plurality of concentric conveyer rings, a plurality of driving rings rotatably mounted in a vertical row on said pedestal and each provided with arms connected with one of said conveyer rings, a plurality of gear pinions mounted on said pedestal and each meshing on its opposite side with an internal gear on one of the driving rings and an external gear on an adjacent driving ring, rotatable tables arranged adjacent to the outer sides of said inlet and outlet, and means for driving each of said tables comprising an upright shaft geared to the lowermost of said driving rings, pulleys connected respectively with said upright shaft and one of the tables, a belt passing with its opposite turns around said pulleys, and guide wheels engaging with the stretches of said belt.

9. An apparatus for treating canned goods comprising a chamber having an inlet and an outlet, and a conveying and guiding mechanism within said chamber for transporting said goods in a circuitous path from said inlet to said outlet comprising a plurality of concentric conveyer rings having a relative rotary movement in opposite directions, concentric perforated steam pipes each having a gap between the opposing ends thereof and the gap of each steam pipe being diametrically opposite the gap of the other steam pipe, and reversing guide plates arranged in each of said gaps and having curved guiding surfaces whereby the canned goods are shifted from one conveyer ring to another.

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