

April 26, 1938.

H. A. KECK ET AL

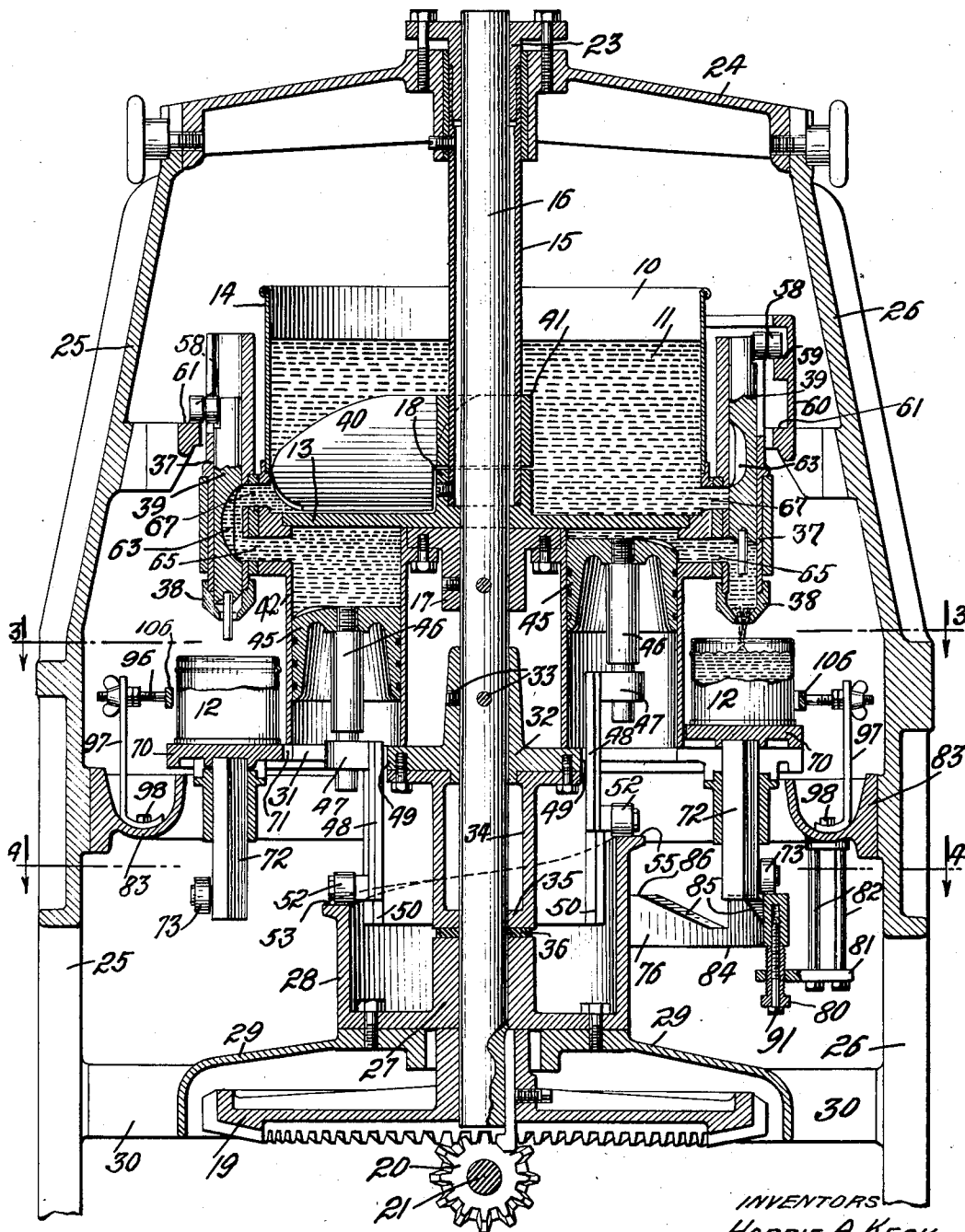
2,115,335

CAN FILLING MACHINE

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4 Sheets-Sheet 1

*Fig. 1.*



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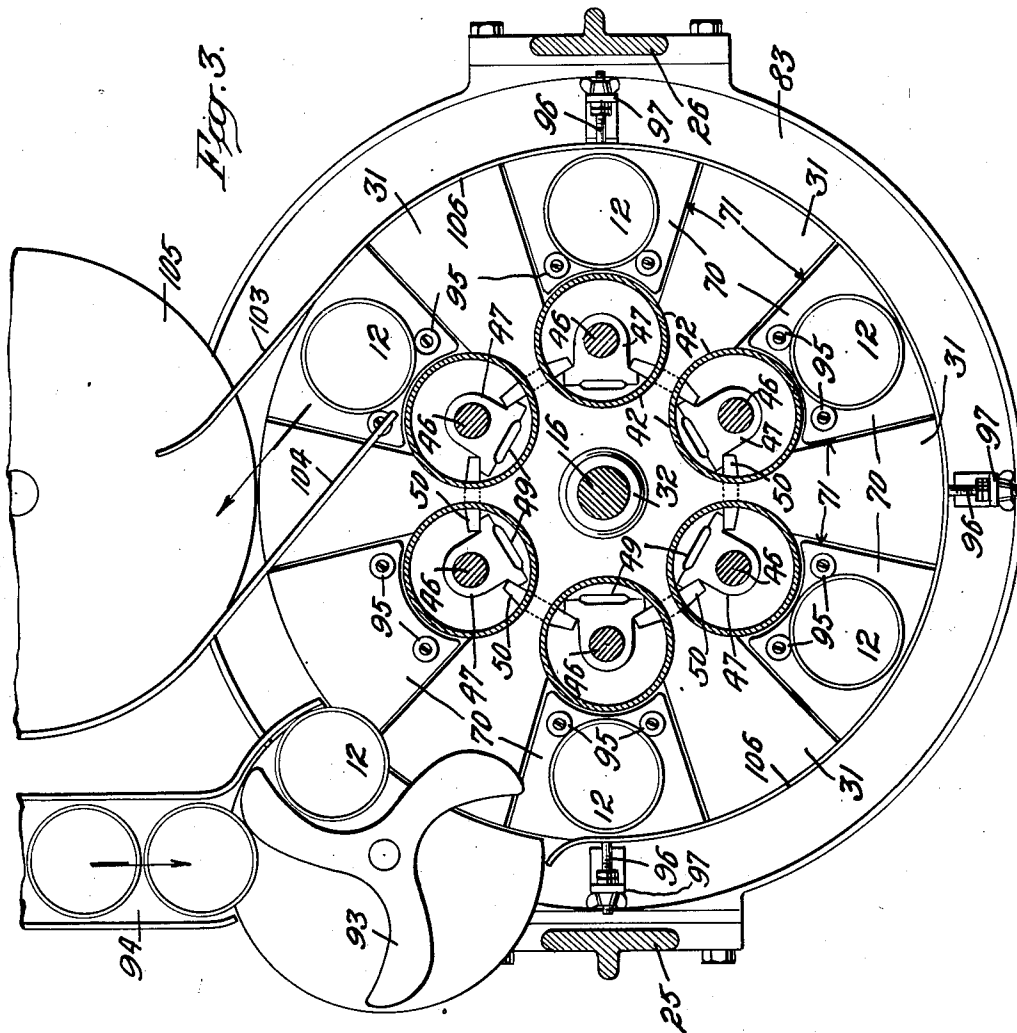
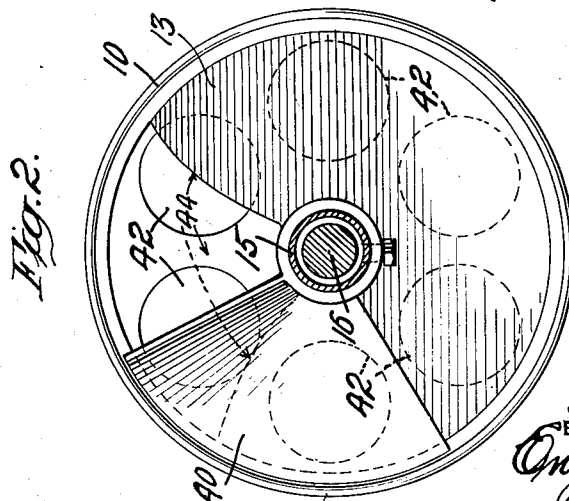
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4 Sheets-Sheet 2



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*Fig. 4.*

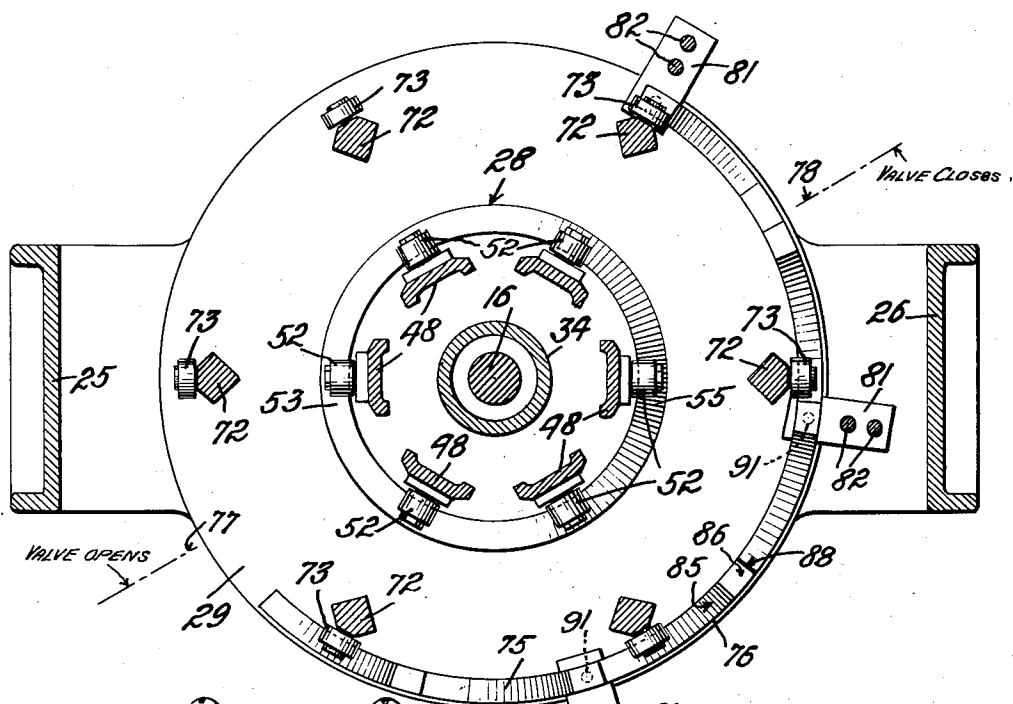
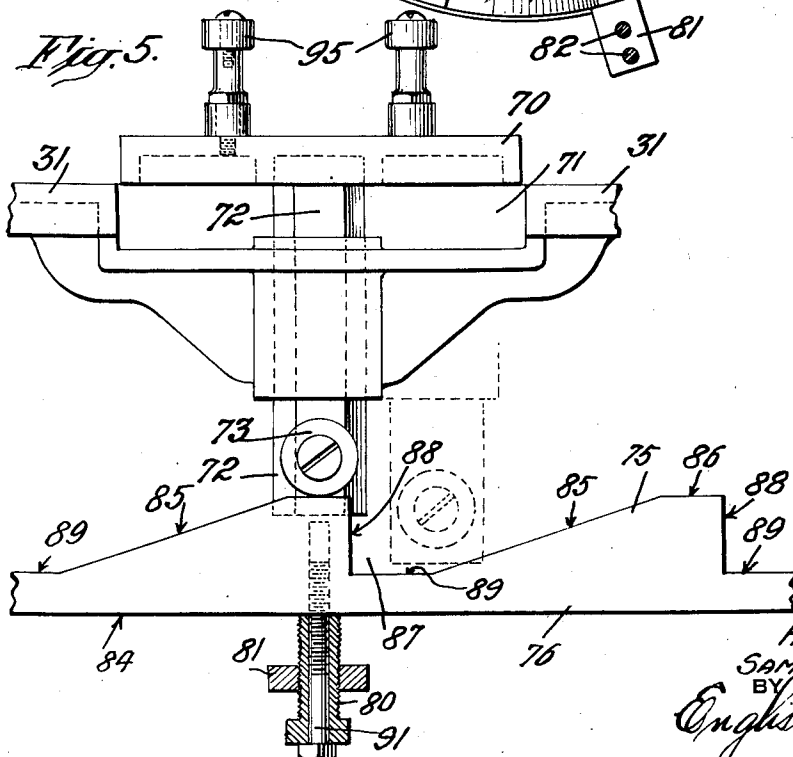


*Fig. 5.*



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*Fig. 6.*

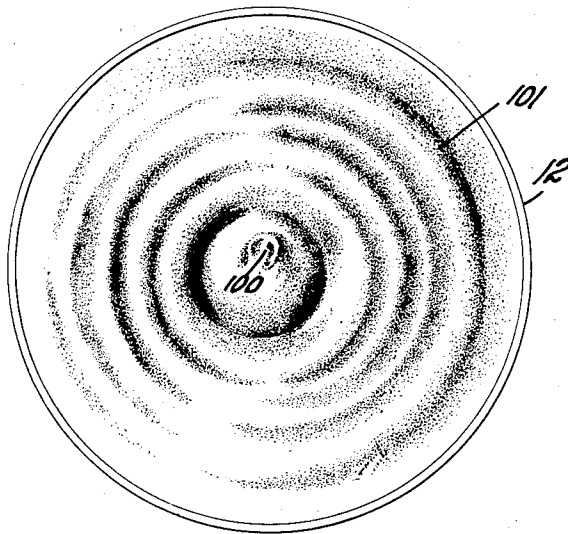
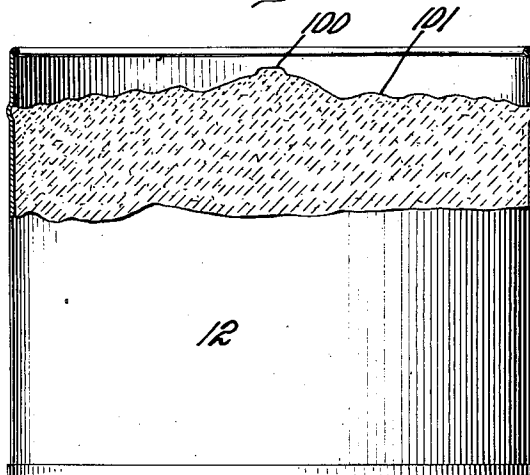


*Fig. 7.*



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## UNITED STATES PATENT OFFICE

2,115,335

## CAN FILLING MACHINE

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pany, Cambridge, Mass., a corporation of Maine

Application November 14, 1936, Serial No. 110,800

5 Claims. (Cl. 226—72)

The invention relates to an improvement in machines for filling cans and other receptacles with various kinds of materials, and more particularly to an improvement in machines for filling receptacles with semi-fluid or lard-like substances, such as hydrogenated cotton seed oil.

It has been proposed heretofore to provide automatic can or other receptacle filling machines with means for shaking or vibrating the receptacles during the filling thereof in order to settle the contents of the receptacles to assure the introduction into them of the requisite amount of material. We are not aware, however, that machines have appeared on the market, (at least we have been unable to procure them) with efficient or satisfactory means for settling semi-fluid or lard-like substances, such as hydrogenated cotton seed oil, in cans or other receptacles during the filling thereof. The automatic filling of cans or other receptacles with semi-fluid or lard-like material presents the problem of introducing into the cans the requisite amount or weight of material, and still keep the middle portion of material in the receptacles, (at which point the material is usually introduced into the receptacles) from projecting upwardly beyond the rim of the receptacles. Such is the nature of these semi-fluid or lard-like substances that if the can or other receptacle remains stationary during the filling thereof, which is usually accomplished through a centrally located valve or nozzle, the middle portion of the material which has been introduced into the can projects upwardly beyond the plane of the upper edge of the rim of the can, so that when the cover has been placed on the filled can the under surface thereof presses down against the upwardly projecting portion of the material which has been introduced into the can, with the result that when the cover is removed from the can a portion of the material adheres to the under surface of the cover. Many efforts have been made to prevent this occurrence, but so far as we are aware, no successful improvement in filling machines directed to the purpose has up to the present appeared on the market.

The object of the present invention is to provide machines for filling cans or other receptacles with semi-fluid or lard-like substances with means for shaking or vibrating the receptacles during the filling thereof in order that, when the receptacles have received the requisite amount or weight of material, the upper surface of the material in the receptacle will be substantially level and will not project upwardly beyond the plane

passing through the upper rim of the body portion of the can, so that none of the material in the can will contact with the under surface of the top or cover of the can. To this end the invention consists in the improved can filling machine hereinafter fully described and particularly pointed out in the appended claims.

In the accompanying drawings illustrating the preferred form of the invention, Fig. 1 is a vertical section of the improved can or receptacle filling machine; Fig. 2 is a top plan, partly in section, of the hollow head or container for holding the material to be introduced into the cans or other receptacles; Fig. 3 is a transverse section taken on the line 3—3 of Fig. 1; Fig. 4 is a transverse section taken on the line 4—4 of Fig. 1; Fig. 5 is a side elevation in detail of one of the vertically movable plates for supporting the cans or receptacles; Fig. 6 is a top plan of a receptacle which has just been filled with material, before the cover is placed thereon; and Fig. 7 is a side elevation, partly in longitudinal section, of the filled can shown in Fig. 6.

The improved can or other receptacle filling machine illustrated in the drawings comprises a hollow rotary head or container 10 for holding the semi-fluid or other lard-like material 11 to be introduced into the cans or other receptacles 12. The head 10 is of annular construction and comprises a stationary disk-like bottom 13, an upstanding rotary outer wall 14 and a stationary inner wall or sleeve 15 which surround the main vertical shaft 16 of the machine. The head 10 is secured by a hub 17 to the shaft 16. The disk-like bottom 13 of the head 10 is provided with a hub portion 18 secured to the lower end of the sleeve 15. The lower end of the shaft 16 carries a bevel gear 19 driven by a pinion 20 mounted on a shaft 21 which may be actuated from any convenient source of power. The upper end of the shaft 16 is journaled in a bearing 23, in which the upper end of the sleeve 15 is fixed and which is located in the upper middle portion of brackets 24 supported on the uprights 25 and 26 rising from the base portion of the machine, which is not shown in the drawings. The lower part of the shaft 16 is journaled in the hub 27 of a cup-like cam member 28 supported on the inverted hood-like structure 29 resting on the arms 30 supported from the lower portions of the uprights 25 and 26.

Mounted on the vertical shaft 16 at about its middle point is a can or other receptacle supporting table 31 the hub portion 32 of which is secured to the shaft 16 by means of the set screws 55

33. The hub 32 of the table 31 is provided with a downwardly extending sleeve 34 the lower closed end 35 of which rests on the upper end of the hub 27 of the cam member 28, being separated therefrom by a thrust bearing or gasket 36.

The head or material-containing receptacle 10 and the table 31 being both secured to the vertical shaft 16 rotate in unison, and as they rotate the material in the head passes under a blade 40, shaped somewhat like a propeller, the hub 41 of which is secured on the lower end of the sleeve 15 forming the inner wall of the material-containing head 10. Equally spaced on the perimeter or circular wall 14 of the head 10 are a series of vertically-arranged valve casings 37 in each of which is a vertically-movable valve member 39 controlling a discharge opening or nozzle 38 through which the material is introduced into the cans or receptacles 12. As the head 10 rotates a portion of the material 11 therein passes under the blade 40 and is forced thereby through the opening 44 (Fig. 2) cut in the disk 13, and so is caused to pass into the upper end of a correspondingly positioned cylinder 42, each of which is connected with and corresponds to a valve casing 37. When a cylinder 42 is under the blade 40 in position to receive material from the head 10, the piston 45 of the cylinder is at its lowest point, as indicated at the left hand side of Fig. 1, thereby providing space at the top of the cylinder above the piston 45 equivalent to substantially the amount of material to be introduced into a can or other receptacle 12.

Each piston 45 is movable vertically in its respective cylinder 42 and is mounted on a vertically-arranged stem or rod 46 the lower end of which is secured in a boss 47 extending outwardly from the upper end of a vertically-arranged plate 48 having a sliding bearing on the inner surfaces of the sides of the upright guides 50, best indicated in Fig. 3, and on the inner surfaces of the sides of the arcuate guides 49 formed on the flange-like part of the hub 32. The upright guides or bearing plates 50 and the guides 49 are secured at their lower ends in the upper inner part of the cup-like cam structure 28. On the outer surface of the lower end of each plate 48 is mounted a roll 52 adapted, as the head 10 and the parts connected therewith rotate, to travel on the upper or cam surface 53 of the circular structure 28. By reference to Fig. 1 it will be noted that the left hand side 53 of the upper or cam surface of the structure 28 is its lowest point so that the left hand piston opposite thereto is at its lowest point, with the result that the cylinder 42 then at this point receives a charge of material from the head 10. As the head and the parts connected therewith rotate the rolls 52 connected with the pistons 45 travel up the incline of the cam surface of the structure 28 until they reach the point diametrically opposite the lowest point 53, that is to say, the point 55 indicated in the right hand section of Fig. 1, at which point a piston 45 is at the limit of its upward movement, having forced the material in the upper part of the corresponding cylinder 42 into the can 12 located under the corresponding nozzle 38.

Each vertically movable valve stem 39 which slides in the upward extension or sleeve 37 of its corresponding nozzle 38 carries on the outer surface of its squared upper end a roll 58 which travels in a cam path 59 formed in the upper inner surface of an arcuate wall 60, the lowest point 61 of the cam path 59 being indicated at

the left hand part of Fig. 1, and the highest point being diametrically opposed thereto or at the right hand part of Fig. 1. When the cylinder 42 has been filled and the head 10 with the parts connected therewith continues to rotate the valve stem corresponding to the just filled cylinder rises and uncovers the nozzle 38 and the passageway 65 leading from the cylinder 42 so that the material in the cylinder is forced by the action of the piston 45 through the nozzle 38 into the can positioned below it. If there is no can in the machine opposite the cylinder being filled, the roll 58 will not travel up the incline 59 and so the valve 39 will not be lifted out of the nozzle 38. Under this condition the piston 45 will force the material in the cylinder back into the head 10 through the passageway 65, the slot 63 cut in the inner face of the valve 39, and the passageway 67 leading from the head 10. The parts just described and their mode of operation are constructed and function substantially like the corresponding parts of machines of this character heretofore produced.

The parts for settling the material in the cans are constructed and function as follows: Each can 12 during its passage through the machine while it is being filled, rests on a plate 70 which is a truncated sector in plan and is located in a correspondingly-shaped opening 71 in the perimeter of the table 31. Each plate 70 is provided with a downwardly extending stem 72, polygonal in cross section, on the outer surface of the lower end of which is mounted a roll 73 arranged to travel on the upper surface of the teeth 75 of an arc-shaped rack 76 located under the path of travel of the rolls 73. By reference to Fig. 4 it will be noted that the arc-shaped rack 76 extends from slightly in advance of the point 77 where the legend indicates that a valve opens to slightly beyond the point 78 where the legend indicates that the valve closes.

The arc-shaped rack 76 is held adjustably in position under the path of travel of the rolls 73 by means of a series of hollow screws 80 each of which passes upwardly through the inner end of a plate 81 held in position by two downwardly extending bolts 82 depending from the under surface of an annular trough-like structure 83 supported from the inner surfaces of the uprights 25 and 26 of the frame of the machine. The under level surface 84 of the arcuate rack 76 rests on the upper ends of the hollow screws 80. The vertical position of the arcuate rack 76, and especially of the upper surface of the teeth 75 thereof, is adjusted by turning the screws 80 in the plates 81. If the material to be filled into the cans 12 is of such consistency that only a slight vibration of the cans is required to settle the material in the cans, the rack 76 is lowered to such position that the rolls 73 engage with the inclined portions 85 of the teeth 75 near the upper level or horizontal surfaces 86 of the teeth so that as the rolls 73 pass beyond the teeth surfaces 86 and then drop down into the spaces 87 defined by the vertical rear side 88 of each tooth and the adjacent slanting side 85 of the next tooth the platforms 70 with the cans thereon fall only a relatively short distance and are given a correspondingly slight shaking or vibration. In the case where the material being introduced into the cans 12 is relatively viscous, requiring a comparatively violent agitation or shaking of the cans in order to settle or flatten out the upper layers of the material in the cans, the rack 76 is raised so that the rolls 73 will

encounter the inclined portions 85 of the teeth 75 at substantially their lowest point, with the result that as the rolls 73 pass over the level or topmost portions 86 of the teeth they will drop to substantially the point indicated at 89 in Fig. 5, which marks the beginning of the rise of the inclined portions 85 of the teeth 75 of the rack 76, thereby permitting the plates 70 with the cans thereon to drop the maximum amount and so impart to the contents of the cans the maximum amount of shaking or vibration to level off the upper cone-shaped or tapered last portion of the material fed into the cans. When the hollow screws 80 have been adjusted to fix the rack 76 in the required position, the check screws 91 which are loosely received in the hollow screws 80 and are threaded upwardly into the rack 76, are tightened in order to prevent the hollow screws 80 from turning. Before the hollow screws 80 can be again adjusted the check screws or bolts 91 must be loosened.

The cans 12 are successively introduced or fed onto the plates 70 by means of a rotary three-armed impeller 93, as shown in plan in Fig. 3, which revolves in clockwise direction and receives the cans one at a time from the chute 94. As the plates 70 move opposite the can engaged by the impeller 93 the impeller pushes the can up against the two centering rolls or stops 95 located at the inner edge of each plate 70. As the table 31 rotates with the cans on the plates 70, the cans are prevented from outward displacement by means of a rail 106 adjustably supported by the bolts 96 screwed into the upper ends of the uprights 97 rising from the bottom of the arcuate trough 83 in which they are secured by the cap screws 98.

It will be understood that the amount of shaking or vibration imparted to the cans or receptacles 12 during the filling thereof in order to level off the upper surface of the material in the cans will depend on the viscosity of the material fed into the cans; the more viscous the material the more shaking or vibration required, and the less viscous the material the less shaking or vibration of the cans required to level off the upper surface of the material in the cans. The present invention provides means whereby the amount of vibration to be imparted to the cans may be accurately adjusted. The settling or leveling off of the material introduced into the cans is regulated according to the invention by causing the cans to drop periodically during the filling thereof a greater or less distance, depending on the viscosity of the material being fed into the cans. The amount of drop of the cans determines the amount of shaking or vibration imparted to the cans and so to the material in the cans, and this in turn regulates the amount of levelling off of the upper surface of the material in the cans, the object to be obtained, of course, being a level upper surface or an upper surface as nearly level as it is possible to produce during the short time consumed in filling the cans. The material introduced into the cans being of lard-like consistency and being fed into the center of the cans naturally tends to form a cone-like structure therein. By periodically dropping the cans a short distance during the filling thereof, the cone of material in the center of the cans is levelled off so that by the time the requisite quantity or weight of material has been introduced into each can the greater part of its upper surface is almost level, as shown in Fig. 7, with a flattened cone at its center which does not project upwardly be-

yond the upper edge of the can. By reason of the fact that the can is periodically dropped during the filling thereof, the upper surface of the material in the can is caused to flatten out in concentric rings, as clearly indicated in Fig. 6, thereby enhancing the attractiveness of the material in the can. The number of times it is necessary to drop the cans during the filling thereof to effect the appropriate settling of the upper surface of the material will depend on the viscosity of the material. With lard-like material of the usual consistency, such as commercial hydrogenated cotton seed oil, it has been found that dropping the cans a distance from about three-quarters of an inch to about an inch from five to seven successive times during the filling operation, causes the upper surface of the material to flatten out sufficiently to feed into the cans the maximum amount of material without having any part thereof project upwardly far enough to contact with the under surface of the cover.

We claim:

1. In a machine for filling cans with viscous-like material wherein a rotary table has a rotary material-containing head moving in timed relation with the table, wherein a series of valves are mounted in the head for controlling the discharge of material therefrom, wherein means is provided for opening and closing the valves as the head rotates, and wherein means is provided for forcing material from the head when the valves are in open position, means for causing the viscous-like material to present a substantially flat topped surface in a filled can comprising a series of vertically movable receptacle supporting plates each of which has a downwardly directed stem directly connected thereto, a stationary arcuate rack located under the path of travel of the plates, each tooth of the rack including a front face sloping upwardly in the direction of travel of the stems and a vertical rear wall, all of the teeth being identical in size whereby the viscous-like material is subjected to a continued uniform settling action, the lower ends of the stems of said plates having means adapted to ride on the upper surface of the teeth of said rack, and to fall into the spaces between the teeth of the rack at the vertical rear walls of the teeth, so that the plates with the receptacles thereon periodically rise and abruptly gravitationally fall identical distances as the receptacles are being filled during the rotation of the head and the table.

2. In a machine for filling cans with viscous-like material wherein a rotary table has a rotary material-containing head moving in timed relation with the table, wherein a series of valves are mounted in the head for controlling the discharge of material therefrom, wherein means is provided for opening and closing the valves as the head rotates, and wherein means is provided for forcing material from the head when the valves are in open position, means for causing the viscous-like material to present a substantially flat topped surface in a filled can comprising a series of vertically movable receptacle supporting plates each of which has a downwardly directed stem directly connected thereto, a stationary arcuate rack located under the path of travel of the plates, each tooth of the rack including a front face sloping upwardly in the direction of travel of the stems and a vertical rear wall, all of the teeth being identical in size whereby the viscous-like material is subjected to

a continued uniform settling action, the lower ends of the stems of said plates having means adapted to ride on the upper surface of the teeth of said rack, and to fall into the spaces between the teeth of the rack at the vertical rear  
 5 is of the teeth, so that the plates with the receptacles thereon periodically rise and abruptly  
 10 gravitationally fall identical distances as the receptacles are being filled during the rotation of the head and the table, and means for adjust-  
 15 y supporting the rack with respect to the light thereof.

3. In a machine for filling cans with viscous-like material wherein a rotary table has a rotary  
 15 material-containing head moving in timed relation with the table wherein a series of valves are mounted in the head for controlling the discharge of material therefrom, wherein means is provided for opening and closing the valves as the head  
 20 rotates, and wherein means is provided for forcing material from the head when the valves are in open position, means for causing the viscous-like material to present a substantially flat topped surface in a filled can comprising a series of  
 25 vertically movable pyramidal-shaped receptacle-supporting plates, each of said plates having at its inner end stops for centering the receptacles moved onto the plates, each plate having a downwardly projecting stem directly connected there-  
 30 to, a roll carried on the outer side of the lower end of each stem, an arcuate rack located under the path of travel of the rolls, the front faces of the teeth of said rack being sloped upwardly in the direction of travel of the rolls and said teeth  
 35 having vertical rear walls, all of the teeth being of identical size whereby the viscous-like material is subjected to a continued uniform settling action, said rolls adapted to travel upwardly on the sloping faces of the teeth and then abruptly  
 40 gravitationally drop identical distances into the spaces between the teeth to cause the receptacles on the plates to rise and fall periodically as they are being filled during the rotation of the head and the table.

4. In a machine for filling cans with viscous-like material wherein a rotary table has a rotary  
 45 material-containing head moving in timed relation with the table, wherein a series of valves are

mounted in the head for controlling the discharge of material therefrom, wherein means is provided for opening and closing the valves as the head rotates and wherein means is provided for forcing material from the head when the valves  
 5 are in open position, means for causing the viscous-like material to present a substantially flat topped surface in a filled can comprising a series of vertically-movable receptacle-supporting  
 10 plates, an arcuate rack located under the path of travel of the receptacle-supporting plates, said plates having downwardly extending members directly connected thereto and adapted to travel on the rack so that as the downwardly extend-  
 15 ing members rotate they travel on the teeth and fall between the spaces therebetween, whereby the plates and the receptacles thereon are shaken or vibrated, and means for supporting and verti-  
 cally adjusting the arcuate rack.

5. In a machine for filling cans with viscous-like material wherein a rotary table has a rotary  
 20 material-containing head moving in timed relation with the table, wherein a series of valves are mounted in the head for controlling the discharge of material therefrom, wherein means is pro-  
 25 vided for opening and closing the valves as the head rotates, and wherein means is provided for forcing material from the head when the valves are in open position, means for causing the vis-  
 30 cous-like material to present a substantially flat topped surface in a filled can comprising a series of vertically-movable receptacle-supporting plates, each plate having a downwardly extend-  
 35 ing stem directly connected thereto, an arc-shaped rack located under the path of travel of the stems of the receptacle-supporting plates, the upper surface of said rack being provided with teeth of identical size and each of which consists of an upwardly slanting front face terminating in a vertical rear wall, and means connected with  
 40 the downwardly projecting stem of each plate adapted to travel on the upwardly slanting faces of the teeth of the rack and to fall into the space between the teeth whereby the plates and the receptacles thereon fall by gravity as the stems  
 45 reach the spaces between the teeth.

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