Dec. 27, 1938. G. M. HARRY 2,141,470

CONTAINER TREATING MACHINE

Filed Feb. 8, 1935 6 Sheets-Sheet 1

Fig. 1

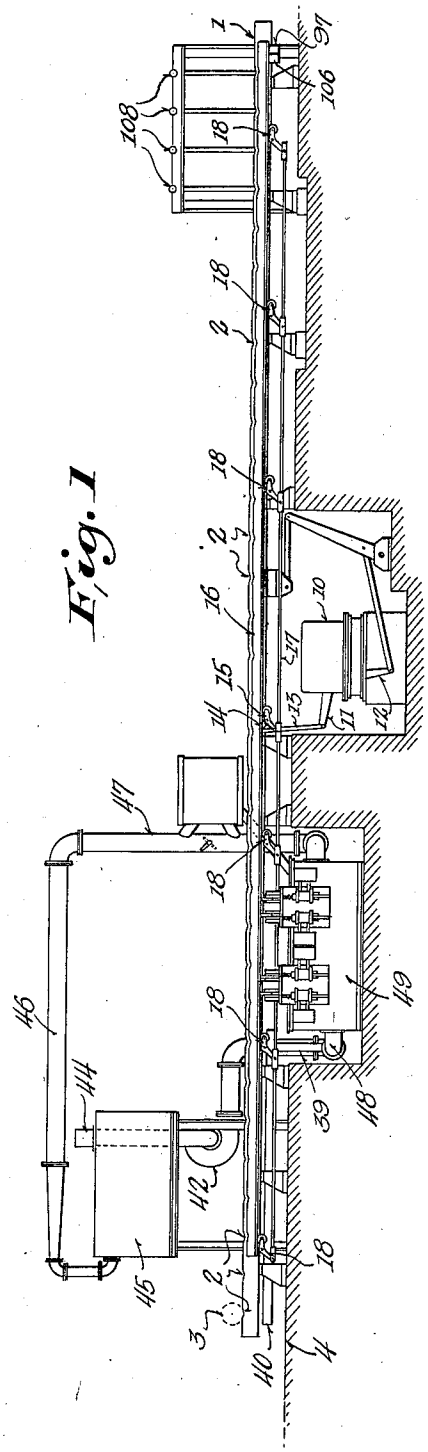
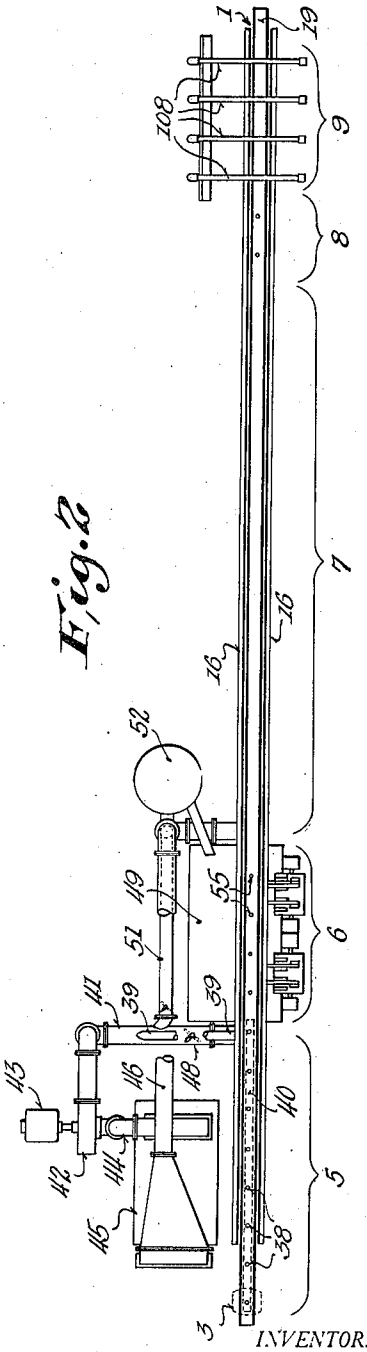


Fig. 2



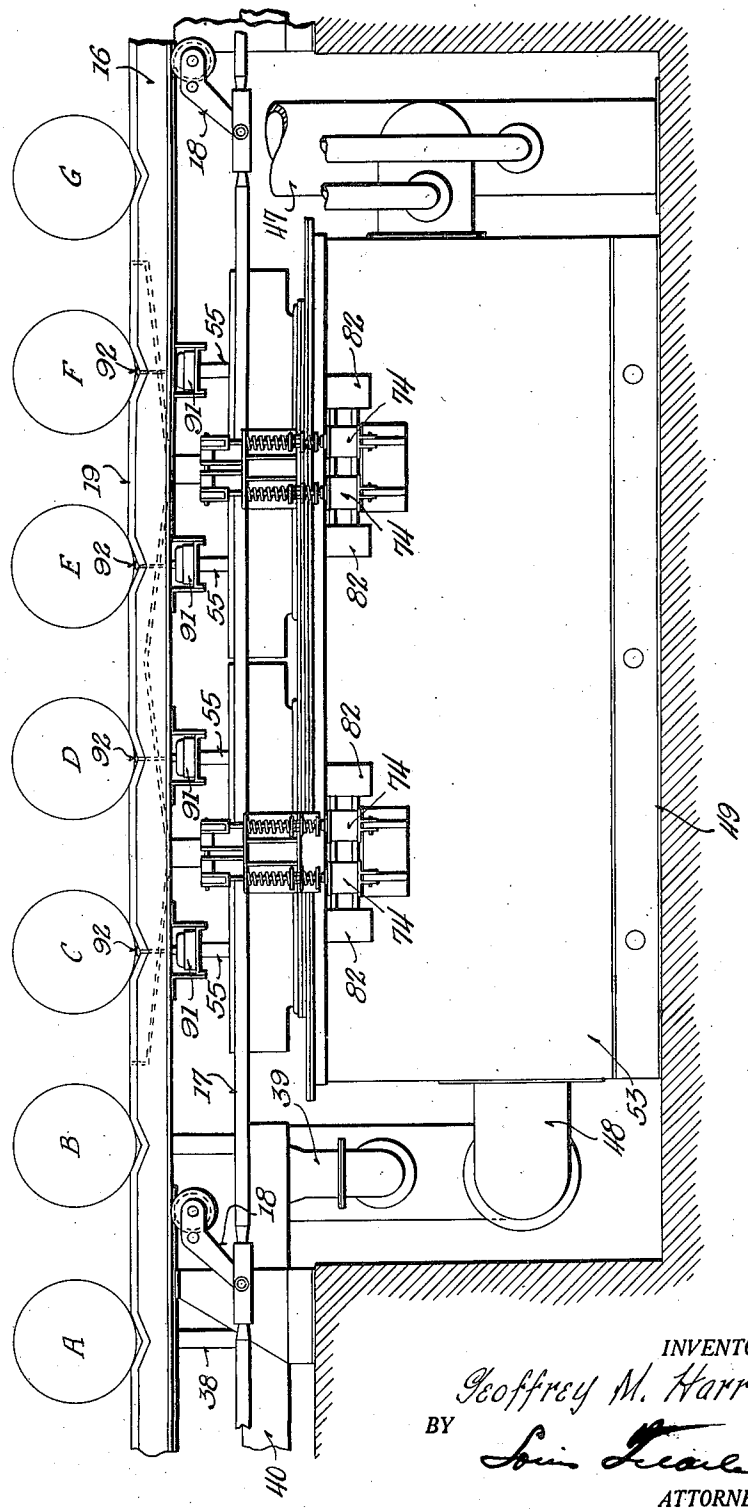
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CONTAINER TREATING MACHINE

Filed Feb. 8, 1935 6 Sheets-Sheet 2

Fig. 3



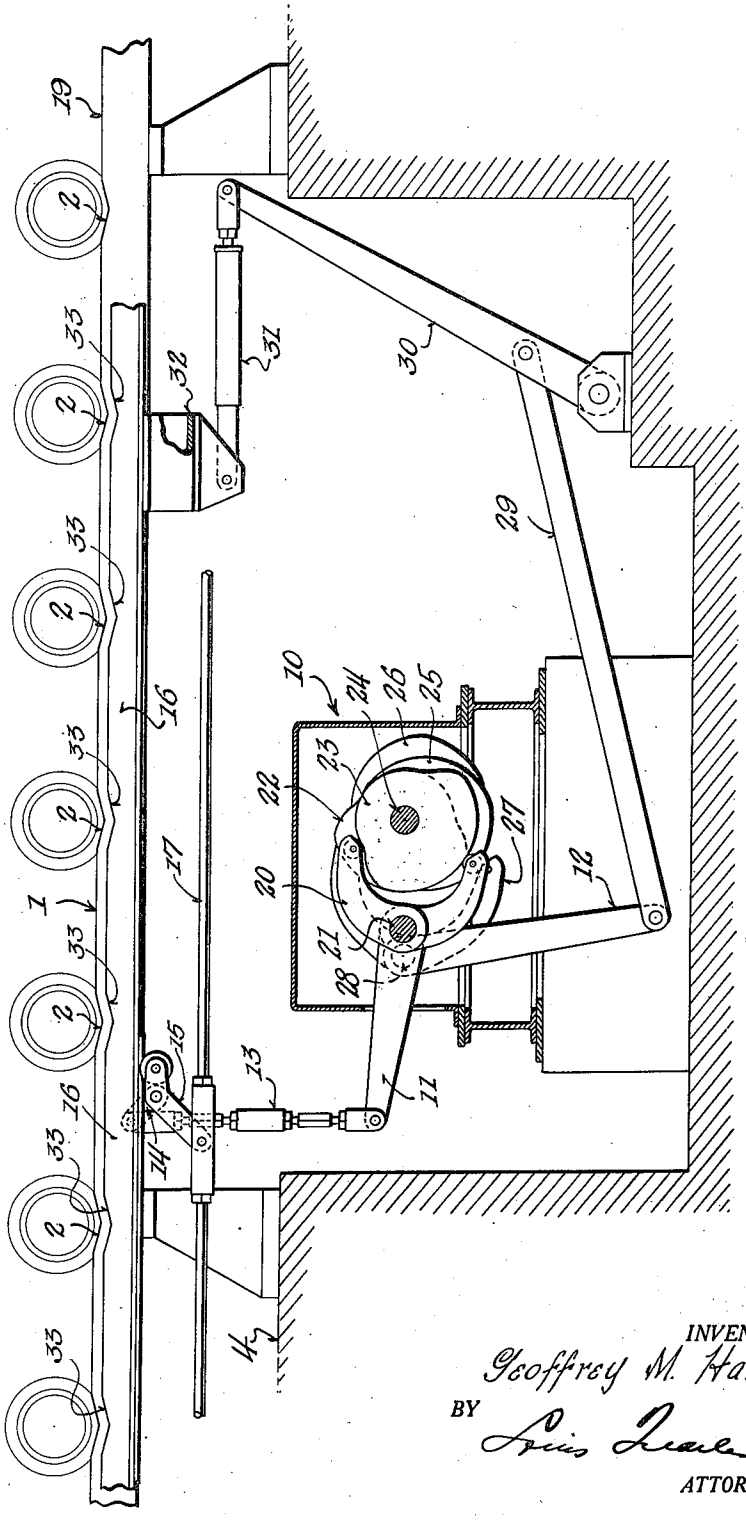
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CONTAINER TREATING MACHINE

Filed Feb. 8, 1935 6 Sheets-Sheet 3

Fig. 4



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CONTAINER TREATING MACHINE

Filed Feb. 8, 1935 6 Sheets-Sheet 4

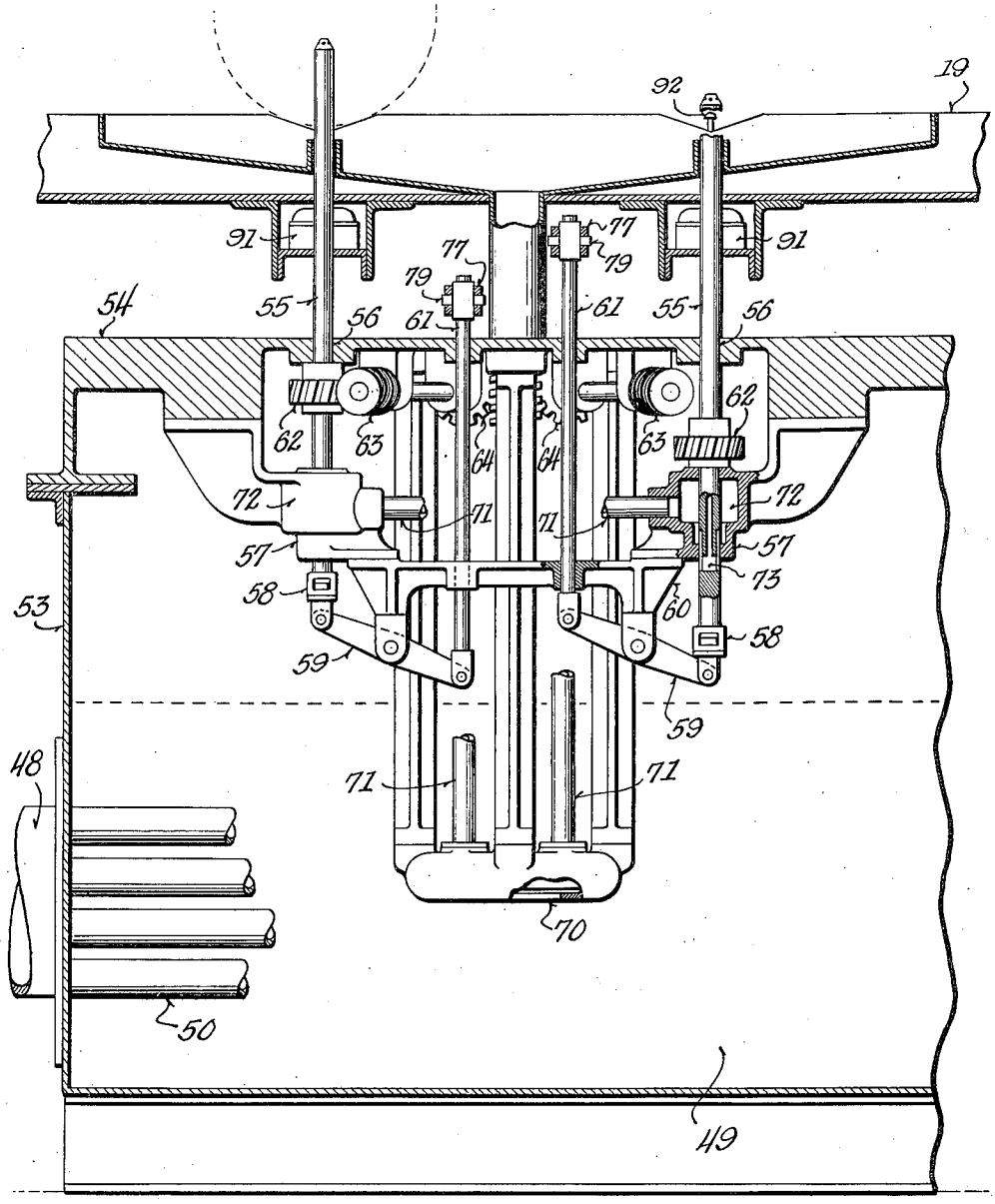


Fig. 5

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CONTAINER TREATING MACHINE

Filed Feb. 8, 1935 6 Sheets-Sheet 5

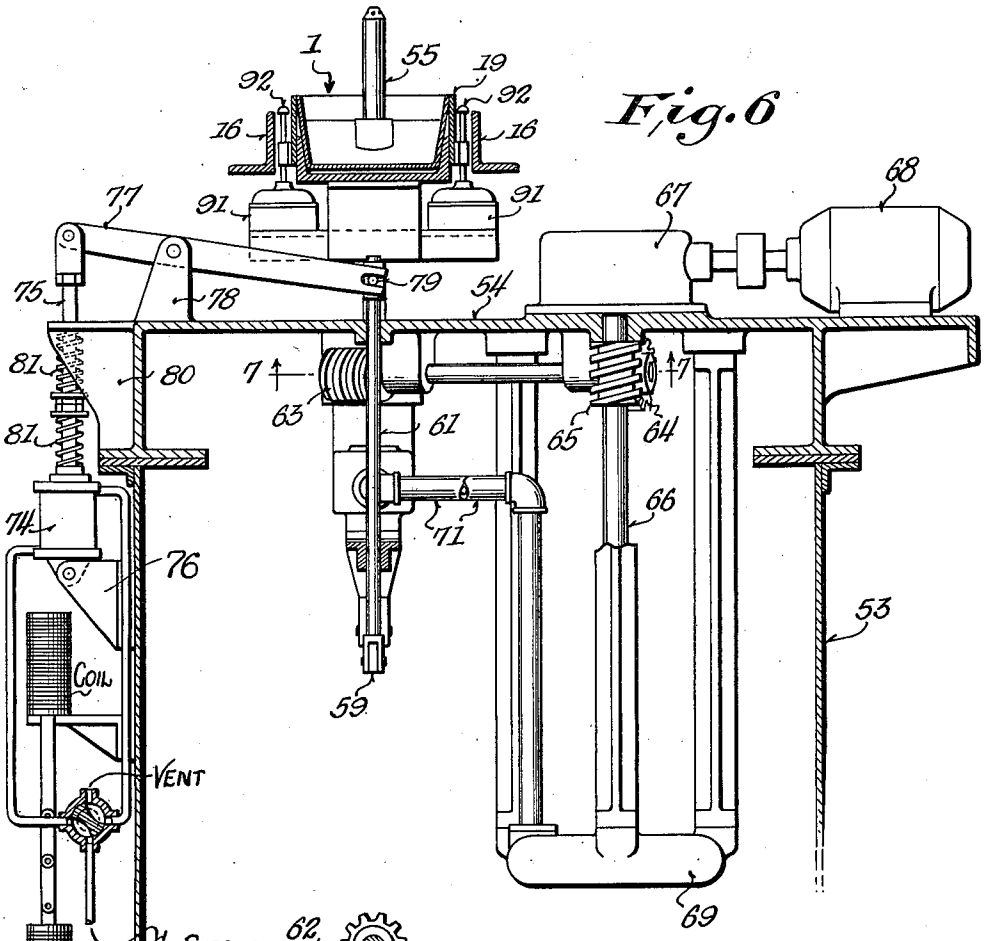


Fig. 6

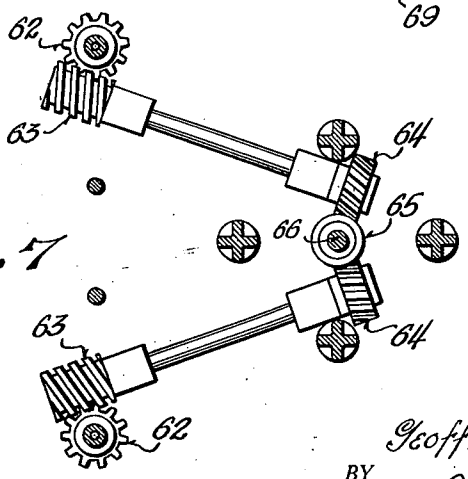


Fig. 7

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CONTAINER TREATING MACHINE

Filed Feb. 8, 1935 6 Sheets-Sheet 6

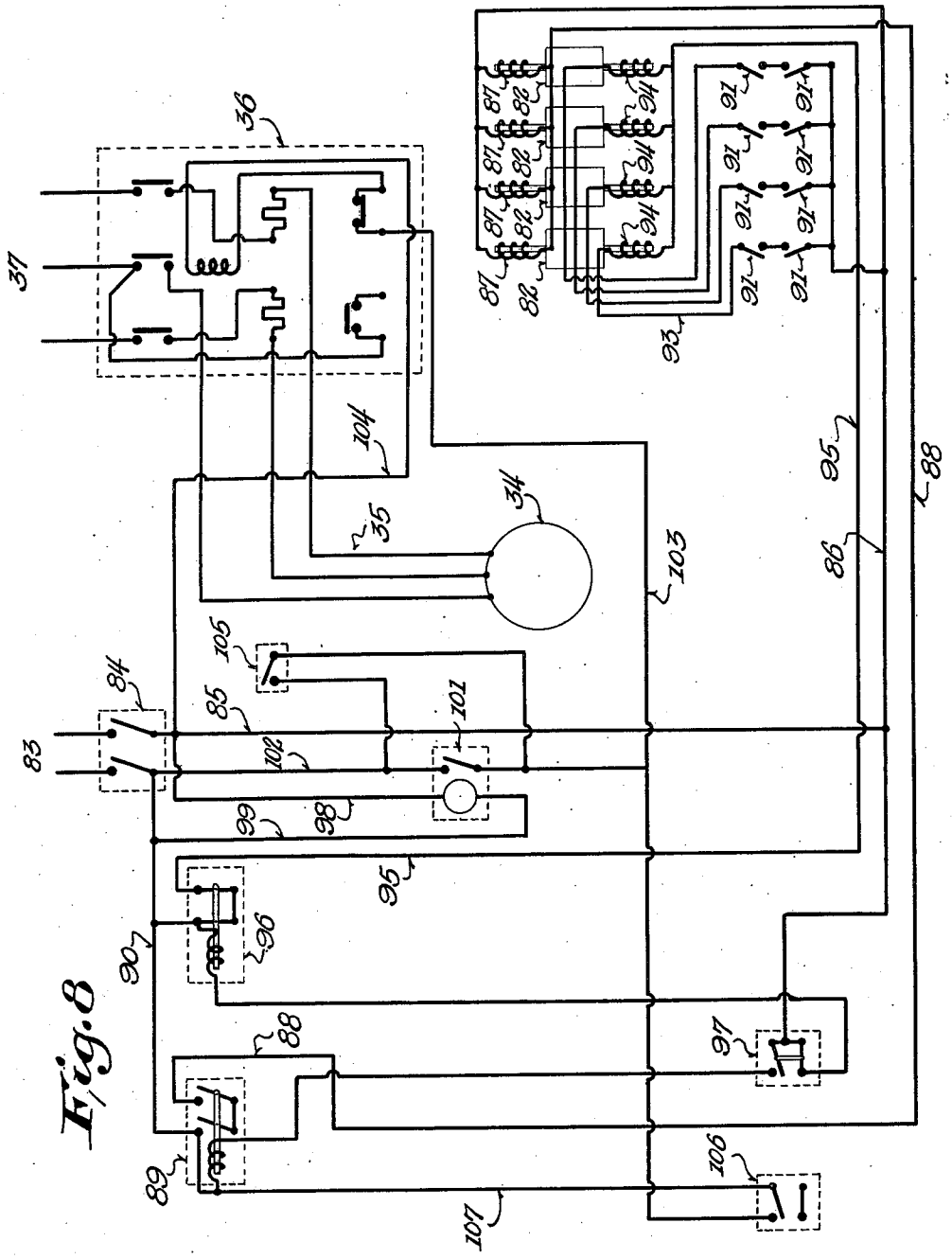


Fig. 8

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UNITED STATES PATENT OFFICE

2,141,470

CONTAINER TREATING MACHINE

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Application February 8, 1935, Serial No. 5,625

3 Claims. (Cl. 91—44)

This invention relates to machines for treating the interior of containers and it consists in a machine wherein containers may be progressively and uniformly treated by apparatus which intermittently advances the containers from treatment step to treatment step in such a manner that the container is properly presented to preheating, pitching, draining, cooling, defuming, and chilling treatments at the right time and in the right position to produce the desired result, the apparatus further being capable of functioning when containers and apparatus are cooperating to prevent a dangerous scattering of hot treating materials.

Heretofore apparatus for treating barrels and like containers of considerable mass and inertia have been employed. Apparatus most widely used in this connection has consisted principally of stationary facilities to which the barrel is brought by hand, placed in proper position, and the treating steps performed under the control and at the will of the operator. In such equipment the amount of hand labor involved is considerable and the treating is ordinarily subject to inaccurate control and expensive variation. Apparatus has been heretofore constructed and used for such treating steps as washing and sterilizing, in which apparatus the container, once placed in position, was carried through the washing and sterilizing steps by the continual operation of the apparatus. In such apparatus, however, a member is ordinarily included which engages the bunghole and the advance of the barrel through the machine is effected by force applied through the instrumentality engaging the bunghole. The wear and tear of such machines upon the barrels is excessive and in case of threaded bungs is wholly impractical. Furthermore, in such machines the continued and proper supply of barrels through every step of its operation is essential to prevent dangerous scattering of treating material.

In the machine of this invention, however, barrels or like containers may be subjected to a complete pitching treatment, once the barrel is placed upon the machine in proper position, without any instrumentality engaging the bunghole and without sliding or rolling movement on the part of the barrel at any step of its treatment, the parts of the apparatus cooperating in such manner that the pitching treatment is applied only when a barrel is properly positioned to receive such treatment, thus avoiding a dangerous scattering of hot pitch, the apparatus, furthermore, being so constructed that the treatment afforded the containers can be regulated to a precise uniformity, once the desired duration of treatment is decided upon, or may be changed at will.

Apparatus of this invention is best described by reference to the accompanying drawings, wherein

Fig. 1 shows a side elevation of a complete machine constructed in accordance with this invention;

Fig. 2 is a plan view of the apparatus as shown in Fig. 1, parts of the same being broken away;

Fig. 3 is a detailed side elevation of the pitching tank and associated parts showing a series of barrels in position;

Fig. 4 is a side sectional view showing details of the flight-actuating mechanism;

Fig. 5 is a sectional view of the mechanism in the interior of the pitching tank;

Fig. 6 is an end sectional view of the parts in the interior of the pitching tank;

Fig. 7 is a sectional view taken at the plane 7—7 of Fig. 6; and

Fig. 8 is a wiring diagram showing the controlling and actuating circuits employed.

As shown in Figs. 1 and 2, a machine constructed in accordance with this invention may take the form of a long flight 1 having a plurality of stations 2 over which containers 3 may be advanced intermittently from station to station. The flight 1 is conveniently mounted slightly above floor level 4. As the containers 3 are advanced along the flight they are carried successively over the preheating zone, indicated by the bracket and numeral 5 in Fig. 2; then over the pitching zone, indicated by the numeral 6, then through a draining and cooling zone 7; then a defuming zone 8; and finally through a shower or chilling zone 9. The advancing of the containers is accomplished by the flight-actuating mechanism 10 located in a pit beneath the floor level 4. The actuating mechanism 10 is provided with an elevating arm 11 and translating arm 12, which are associated to move in co-ordinated sequence, the elevating arm 11 cooperating through push-rod 13 and rocker-arm 14 mounted rigidly upon a rockshaft carrying the bell-crank 15. One end of bell-crank 15 bears a roller in supporting contact with the under side of a movable rail 16 of flight 1.

As shown more clearly in Fig. 4, the lower end of bell-crank 15 is in pivoted engagement with a tie-rod 17 which is positioned parallel to the rail 16 and runs beneath the same practically throughout the entire length thereof, engaging pivotally the lower end of a plurality of bell-

cranks 18, all of which are mounted upon rocker-shafts and carry supporting rollers upon their free ends which engage the underside of the movable rails 16.

As shown in Fig. 2, the flight 1 is composed of a central fixed rail 19 flanked on either side by the rail 16, a detailed construction of the same being shown in section in Fig. 6. Although not shown anywhere in the drawings, the rockshafts which bear the bell-cranks 18 extend beneath the fixed rail 19, and bear on their opposite ends exactly similar bell-cranks 18 and supporting rollers at their free ends engaging the underside of the opposite movable rail 16.

Referring now to Fig. 4, it will be noted that the arm 11 is rigidly associated with a fork 20, which fork is mounted for pivotal movement upon a shaft 21. The tips of the fork 20 bear rollers which engage the cam surfaces of a pair of cams 22 and 23, respectively. It will be observed, therefore, that as cam-shaft 24 is rotated in a counterclockwise direction from the position shown in the drawings, arm 11 will dwell while cylindrical portions of cams 22 and 23 are traversed, after which the arm 11 will be compelled in a positive fashion to move in a counterclockwise direction, causing the push-rod 13 to descend and the rock-shaft bearing bell-crank 15 to rotate and causing the rollers on the free ends of all of the bell-cranks 18 to rise simultaneously, lifting both of the movable rails 16. As the cam shaft 24 continues to rotate the rollers on the fork 20 engage a cylindrical portion of the cams 22 and 23, whereupon the arm 11 will dwell in its depressed position, maintaining the rolls 16 in their raised position.

During the dwell of rail 16 in raised position the rotation of cam-shaft 24 likewise is causing the rotation of a pair of cams 25 and 26, the surface of which cams engage rollers on the tips of fork 27, said fork being rigidly associated with the arm 12 and mounted for pivotal movement upon the shaft 28, shown in dotted lines. The arm 12, through connecting-rod 29, walking-beam 30, and connecting-rod 31 engages a stirrup 32 joining the under side of the movable rails 16 so that as the arm 12 is moved the movable rails 16 are subjected to a horizontal translatory movement. The movement of the arm 12 is compelled positively by the pair of cams 25 and 26 so that during the downward dwell of the rail 16 the arm 12 moves in a clockwise direction, causing the rail 16 to shift a predetermined distance to the left and during the upward dwell to shift a predetermined distance to the right, said distances being twice the space between the notched stations 33. As specifically shown in Fig. 4, the translatory movement takes place over the distance between two of the notched stations 33. Upon the completion of the movement of the rail 16 to the right, the pair of cams 22 and 23 reach the end of their cylindrical portion and the fork 20 and arm 11 begin to rotate in a counterclockwise direction, causing the rails 16 to descend.

As shown in Fig. 4, the apparatus has just reached the end of the downward movement of the rail 16 and the fork 20 is again beginning to engage a cylindrical portion of the pair of cams 22 and 23, causing the dwell of the rails 16 in lowered position. During the latter dwell the pair of cams 25 and 26 acting upon fork 27 cause a shifting to the left of the rail 16 the distance of twice the space between stations 33. If the apparatus is to be operated periodically, it is convenient that the same be stopped at some predetermined point. If desired, the machine may be repeatedly stopped in the position shown in Fig. 4.

The shaft 24 is driven by a suitable source of power, such as an electric motor, the motor not being shown but the same being diagrammatically indicated at numeral 34 in Fig. 8. The motor 34 is supplied through lines 35 by power from a starting-box 36 deriving its source of supply from lines 37, the manner in which the controls for motor 34 are actuated being described later in connection with the pitching mechanism.

As noted above, the preliminary portion of the flight 1 passes through the zone 5, which has been referred to as the preheating zone. In zone 5, beneath each station 33 is a nozzle 38, shown in Fig. 2, supplied with a blast of hot air through a pipe 39 and a trunk 40, the latter being beneath the stationary portion 19 of the flight 1. The pipe 39, which is shown broken in Fig. 2, connects, as shown in Fig. 1, with a main supply trunk 41 which receives the discharge from the hot blast fan 42, fan 42 being driven by motor 43. The inlet of the fan 42 is supplied through leader 44, which connects with an air-heating furnace 45, which is fired by any suitable fuel. The supply of air to be heated by furnace 45 enters through the return-pipe 46, which in turn connects with a collecting riser 47 into which spent air from various apparatus being heated is discharged. Hot air from the main supply trunk 41 is directed through pipe 48 into the interior of pitching tank 49 passing through heating tubes 50, as shown in detail in Fig. 5, from which the air is conveyed back into riser 47. Hot air may also be supplied from the main trunk 41 through the pipe 51 to the melting-pot 52 in which fresh pitch for the pitch tank 49 can be prepared.

The pitching tank 49 is shown in detail in Figs. 3, 5, 6, and 7, Fig. 3 being a detailed side elevation from the same position as shown in Fig. 1, the parts being more clearly discernable. The pitching tank 49 is comprised of a rectangular enclosure 53 adapted to contain a body of molten pitch at approximately the level indicated in Fig. 5. The main mechanism of the pitching tank is mounted on a lid 54 suitably constructed of an appropriate casting.

As shown in Fig. 6, the flight 1 passes above the lid 54. Emerging from the lid 54, as shown in Fig. 6, and more clearly in Fig. 5, and passing upwardly through the flight 1 and rising slightly above the upper surface of the same, are the spray heads 55. Said spray heads, as shown in Fig. 3, are four in number, being alike in construction and mode of operation.

Referring now to Fig. 5, the spray head 55 and its associated mechanism will be described in detail, the description being applicable to each of the other spray heads. The spray heads extend downwardly through the lid 54 and are journaled to turn in bearings at 56 and 57, the heads, however, being capable of a vertical sliding movement through said bearings. Rotatably mounted along the axis extended of the spray heads 55 are the swivels 58 through which axial force may be applied to said spray heads while the latter are rotating. The swivels 58 are actuated by rocker-arms 59 which engage through a pin connection and slotted hole in the end of said rocker-arms but hidden by part 58. The rocker-arms are pivotally mounted upon a frame 60 and are engaged at their opposite ends by vertical push-rods 61, a slotted hole in said rocker-arms 59

being provided at the point of engagement but hidden by the lower part of push rods 61. The push-rods 61 are actuated by means to be described later.

Rigidly secured to said spray heads 55 to rotate therewith, are worm gears 62, positioned and adapted to roll into engagement with the continuously rotating worms 63 at the upper end of the vertical excursion of said spray heads 55. The worms 63 are driven by worm gears 64, which are constantly in mesh with the worms 65, which are mounted to rotate with a vertical shaft 66, which in turn is driven by a gear reducer 67 and a motor 68, the latter parts being more clearly shown in Figs. 6 and 7. The vertical shaft 66, as shown in Fig. 6, descends to a bearing, not shown, in the upper portion of pump casing 69 and carries on its lower extremity a pump impeller rotatable in said pump casing 69. As shown in Fig. 5, the entire pump assembly is immersed below the liquid level of the pitch and is opened below at 70 for the inlet of pitch.

Communicating with the pressure side of the pump casing 69 are conduits 71 connecting with bustle chambers 72 formed directly above the bearings 57 and surrounding said spray heads. The spray heads are centrally bored from their tops downwardly to ports 73 shown only in the right hand portion of Fig. 5, said ports 73 being pierced laterally through the spray heads at the bottom of the central bore. As shown in the right hand portion of Fig. 5, the ports 73 in addition to their lateral extension extend vertically for a short distance along the exterior of said spray head for a sufficient distance so that when the spray head is in lowered position an escape for pitch is provided, permitting the pitch to flow from the bustle downwardly, back into the pitch tank. In this way when said spray head is in lowered position a continuous circulation of pitch takes place, entering through the opening 70, rising through connecting conduit 71, entering the bustle 72, and emerging through port 73 back into the pitch tank, this circulation being of importance in preserving uniformity in heating and composition of pitch. When the spray heads 55 are raised, as shown on the left portion of Fig. 5, the entire port 73 becomes enclosed within the passage 72 and the only escape for pitch is upwardly through the central bore, through which it travels and is subsequently ejected from the tip of the spray head in the form of a suitable spray.

The scope of operation of the spray head above described includes an upward and downward movement. In the upper position the spray head, in addition, is subjected to a rotating movement by the worms 63 and, further, in the upper position fluid is forced through the central bore and ejected through the upper end of said spray head. In the lower position the spray head is quiet and through the arrangement of port 73 and the bustles 72 the circulating stream of fluid is returned continuously to the tank.

Means for actuating the spray heads 55 is shown more clearly in Fig. 6. In this figure pneumatic cylinders 74 containing pistons, not shown, and acting upon piston-rods 75 are secured by means of a bracket 76 to the side of the tank 53. The upper ends of piston-rods 75 are in pivotal engagement through a slotted hole with a rocker-arm 77, which is mounted to rock upon the bearing 78 secured to the lid 54 of the tank. A slot in the opposite extremity of said rocker-arm 77 engages a transverse pin 79, suitably secured in the upper ends of push-rods 61. The piston rods 75 are guided by brackets 80, which form a rigid part of lid 54, and between the top of cylinder 74 and the brackets 80 are restoring springs 81 so proportioned and arranged as to return the piston-rods 75 to lowered position corresponding to the retracted position of the spray heads 55.

The pneumatic cylinders 74 are actuated by air supplied and released both above and below said pistons by means of supply lines and solenoid valves, shown only diagramatically in Fig. 8 but in detail in Fig. 6, the solenoid valves being designated by the numeral 82. The solenoid valves are energized by the following electrical connections. As shown in Fig. 8, control current is supplied through lines 83 by closing the manually-operated switch 84, the circuit being completed as follows: Conductor 85 joining conductor 86 furnishes a common supply to each of the actuating coils 87. Current from said coils returning through the common return 88 passes thence to the relay switch 89 and through conductor 90 back to the lines 83, relay switch 89 being controlled by means to be described later.

When actuating coils 87 are thus energized, each of the solenoid valves controls each of the pneumatic pistons 74, which in turn control each of the spray heads 55, and directs the air to said pistons to cause the pistons to descend to lowered position. In this movement, as indicated above, the springs 81 assist in returning said pistons, the pneumatic return being employed as a precautionary measure in the event of failure of the spring.

The upward movement of the piston rods 75 is induced by the actuation of depression contacts 91 as follows: Said depression contacts are provided with vertical stems bearing pressure feet 92 at the upper extremity thereof. Said depression contacts are arranged one on each side of the stationary central rail 19 of the flight 1, as shown in Fig. 6, and in registry with the root of each of the four notched stations adjacent to the four spray heads 55. The pressure feet 92, as shown in Fig. 5, particularly on the right end portion thereof, normally project slightly above the root of said notched stations.

As shown in dotted lines on the left portion of Fig. 5, when a barrel is in position with the spray head within the bung of the barrel, the pressure feet on either side of said spray head are in contact with the barrel and depressed, thus closing depression contacts 91. Furthermore, due to the position of the spray head, unless said barrel engages said notched station with the spray head within the hunghole, not more than one of the pressure feet 92 will be in contact with said barrel and depressed. There being, therefore, two depression contacts adjacent to each spray head and said contacts being as shown in Fig. 8, in series connection, a completed electrical path through respective pairs of depression contacts 91 is not created unless a barrel engages a pitching station with a spray head penetrating its bunghole. With a barrel in position as shown on the left portion of Fig. 5, the pair of depression contacts 91 occupying the position to the left in Fig. 8 would be closed and the left hand solenoid valve 82 would be actuated by current flowing through conductor 93, entering actuating coil 94, flowing through common return conductor 95, through relay switch 96, and through the conductor 90 to the supply lines 83, and thence through the conductor 85 to the return side of

the pair of depression contacts 91. In both the opening and closing movements of the valves 82 the favorable closing of relays 89 and 96 has been assumed and the equipment for their actuation includes means engaging the movable rails 16 of flight 1, the description of which parts is more conveniently associated with the description of the control system above referred to for the flight actuating mechanism 10.

It has been noted that a motor 34, as indicated in Fig. 8, supplied through lines 37, is the source of actuating movement of the flight and this is accomplished as follows: The control current entering through lines 83 and passing through conductor 85 is supplied to limit switch 97, which is arranged in conjunction with the rails 16 so that it occupies the position shown in Fig. 8, only when the rails 16 are in the extreme right hand position, as shown in Fig. 1. The limit switch, as shown in Fig. 1, is at the extreme right hand end of the flight 1 and in contact with the rails 16. While in this position the rails may be considered to be at rest and while in such position the various pitching, preheating, etc., treatments are taking place. In this situation it is necessary that relay 96 be closed so that the depression contacts 91 can energize coils 94 and produce the necessary movement of the pitching apparatus. It will be noted that the limit switch 97 completes the circuit as follows: Current supplied through conductor 85 flows to the left through conductor 86, thence through limit switch 96 and back to the line through conductor 90.

The limit switch 97 performs a further function of interrupting the action of the return coils 87 when the rails are at the extreme right hand position, by reason of the fact that the common return conductor 88 for the coils 87 terminates at the relay 89 and the completed return through conductor 90 to the lines 83 is only possible when the coil of relay 89 is actuated. This can only occur when the limit switch 97 is thrown to the opposite position from that shown in Fig. 8. In addition to the fact that limit switch 97 prevents coils 87 from functioning during the time that coils 94 are active, the limit switch further positively energizes the coils 87 whenever the flight is in a part of its cycle away from the extreme right hand end. The effect of this is to make impossible the spraying of pitch at any time except during the period of repose on the rails 16 when spraying is desired.

The motor 34 shown in Fig. 8 furnishes the necessary energy for causing movement of the flight rails 16 and is subject to control as follows: Control currents entering through lines 83 pass through conductor 98, through the motor of periodically-closing timeswitch 101, and thence through conductor 99 back to the line. The contacts of timeswitch 101 come into momentary engagement at predetermined intervals, for example, engagements may be spaced from several seconds to many minutes apart. At the moment of engagement of said contacts, control current entering through conductor 102 passes through the contacts and to conductor 103 and thence to the right and up into the holding coil of starting box 36, and from said starting box through conductor 104 back to the line. During the momentary contact of switch 101 the motor 34 is placed in motion, the limit switch 97 thrown to the opposite position, and the additional limit switch 106, occupying a position side-by-side with limit switch 97, is closed. Upon the closing of limit switch 106, control current entering through conductor 90 and passing through conductor 107 and limit switch 106 passes to the right through conductor 103 and continues to maintain the holding coil of the starting box 36. The motor 34 therefore will continue to run, which it does, carrying the flight rails 16 to the left, then raising them, then carrying them to the right, and then lowering them. During the lowering movement, however, both of the limit switches 97 and 106 are engaged and moved to the position shown in Fig. 8. When this occurs the motor 34 is stopped and will not resume operation until the contacts of switch 101 again come into engagement. If for any reason manual control of the apparatus is preferred, the push-button 105 may be employed in place of the time contact switch 101.

As noted above, the rails 16 during each cycle are displaced laterally twice the distance between notched stations. The complete handling of a container, bearing this in mind, is now described. Starting as in Fig. 1 a container 3 is placed upon the stationary rails 18, in the position shown, with its bunghole directly over the air outlet 38. This may be done manually or by any suitable mechanical arrangement. Switch 84 is then closed and upon the first engagement of contacts 101 the rails 16 will be displaced to the left until the extreme left hand notch thereof is beneath the container 3. Lateral movement of the rails 16 then ceases and vertical elevation thereof takes place until container 3 is lifted clear of the stationary rail 19. The rails 16 now bearing the container then move laterally to the right a distance equal to twice the distance between notched stations 33. Lateral movement of the rails 16 then ceases and the rails are moved downwardly to the position shown in Fig. 1. The container will then have been moved two stations to the right and will remain upon stationary rail 19 until time-clock 100 again brings contacts 101 into engagement. During this time hot air is being forced through outlets 38 into the interior of the container, preheating the same. The next time the cycle of movement of rail 16 occurs the container will again be advanced two spaces to the right and thus after four periods of dwell above the preheating outlets 38 the container is prepared for pitching.

During the next cycle of movement the container will be deposited over the left hand spray head 55 in the position of container C in Fig. 3. It will be noted that due to the lifting, carrying, and depositing movement of the rail 16, the bunghole of container C will be in direct position for the entrance of the spray head 55 and this condition being fulfilled the presser feet 92 of depression contacts 91 will be in engagement in such a way that the circuit will be completed for the actuation of solenoid valves 82, causing pneumatic cylinder 74 to act upon piston-rods 75 and ultimately to cause spray head 55 to rise into the interior of container C and in raised position to rotate and spray the interior of container C. When the rails 16 commence the next cycle their next movement is a vertical movement, lifting the container from the stationary rails 19. In so doing depression contacts 91 are broken and the spray head 55 retracted, causing a cessation of spray.

In its next position the container will occupy position E, where spraying will be completed. In its next position the container will occupy position G and will be progressively carried toward the right hand end of the machine, as described, through the zone 7, during which the

barrel will drain and cool, and finally into zone 8, where a strong current of air is directed into the container to drive out any fumes. Thereafter the container is deposited successively under showers 108 where it is thoroughly chilled and washed, both inside and out, after which it may be rolled from the end of stationary rails 19, if desired, or may be lifted manually or by any mechanical means.

It will be observed that the machine of this invention through the cooperation of its parts can be employed for the complete internal and external treatment of a container, the operation being entirely independent of means engaging the opening of said container, which means ordinarily are destructive to said openings. The machine, furthermore, handles containers without sliding or rolling contacts, such as would have an abrasive action on the exterior thereof. The machine is well adapted for the handling of material such as hot pitch by reason of the fact that the hazardous scattering of the pitch by the machine is practically impossible.

The apparatus has been described in connection with a mode of operation which produces the usual pitching steps for the treatment of the interior of beer barrels, whether the same be of metal or wood. The machine, of course, is equally well adapted to the treatment of any containers having an opening, as, for example, the washing and cleansing of containers such as are used in the petroleum industry, or for the painting of the interior of containers, or for the performance of any equivalent operation. In each case the principle of employing a flight of the type described in connection with fluid-applying means may be the same in a wide variety of applications.

The machine of this invention has been herein described in connection with a specific form thereof, but it is intended that the protection of Letters Patent to be granted hereon be not unnecessarily limited thereby, but extend to the full range of the invention as represented by the scope of the claims appended hereto.

What I claim as my invention is:

1. In a machine for treating containers having an opening, the combination comprising a movable spray head, means for projecting and retracting said spray head and supplying fluid thereto when in the projected position, a bed for supporting a container with the opening thereof in position to permit said spray head in retracted position to slightly penetrate said opening, depressible electrical contacts positioned on opposite sides of said bed to be depressed by said container when the same is positioned with the opening thereof surrounding said spray head so that said container is supported entirely by said bed, spray head actuating means for actuating the projecting movement of said spray head and the supplying of fluid thereto, and electrical connections passing through said contacts in series for energizing said actuating means.

2. In an apparatus of the class described having a stationary bed with spaced stations and a flight movable in the path above and below said bed, the combination comprising actuating means for cyclically moving said flight by successively raising said flight from beneath said bed to a point above said bed then moving said flight horizontally above said bed then lowering said flight beneath said bed and finally returning said flight horizontally to its original position, an electric motor drivingly connected with said actuating means, a periodically closing time switch for furnishing a supply of electrical energy to said motor at selected intervals, means actuated by the arrival of said flight at a predetermined point in its cycle of movement for interrupting the supply of energy to said motor to stop the same and bring said flight to rest until said periodically closing time switch re-establishes the energy supply to said motor, instrumentalities associated with said flight for operating upon articles transported thereby, and operating means for said instrumentalities energized by contact with said operating means of said articles upon arrival in proper position at said instrumentalities and the conjoint contacting of said operating means by said flight at the point in its cycle where it comes to rest.

3. In a flight conveyor of the class described having a stationary bed with spaced stations and a flight movable in a path above and below said bed, the combination comprising actuating means for cyclically moving said flight by successively raising said flight from beneath said bed to a point above said bed then moving said flight horizontally above said bed then lowering said flight beneath said bed and finally returning said flight horizontally to its original position, an electric motor drivingly connected with said actuating means, a periodically closing time-switch for furnishing a supply of electrical energy to said motor at selected intervals, and means actuated by arrival of said flight at a predetermined point in the cycle of movement for interrupting the supply of energy to said motor to stop the same and bring said flight to rest until said periodically closing time-switch re-establishes the energy supply to said motor.

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