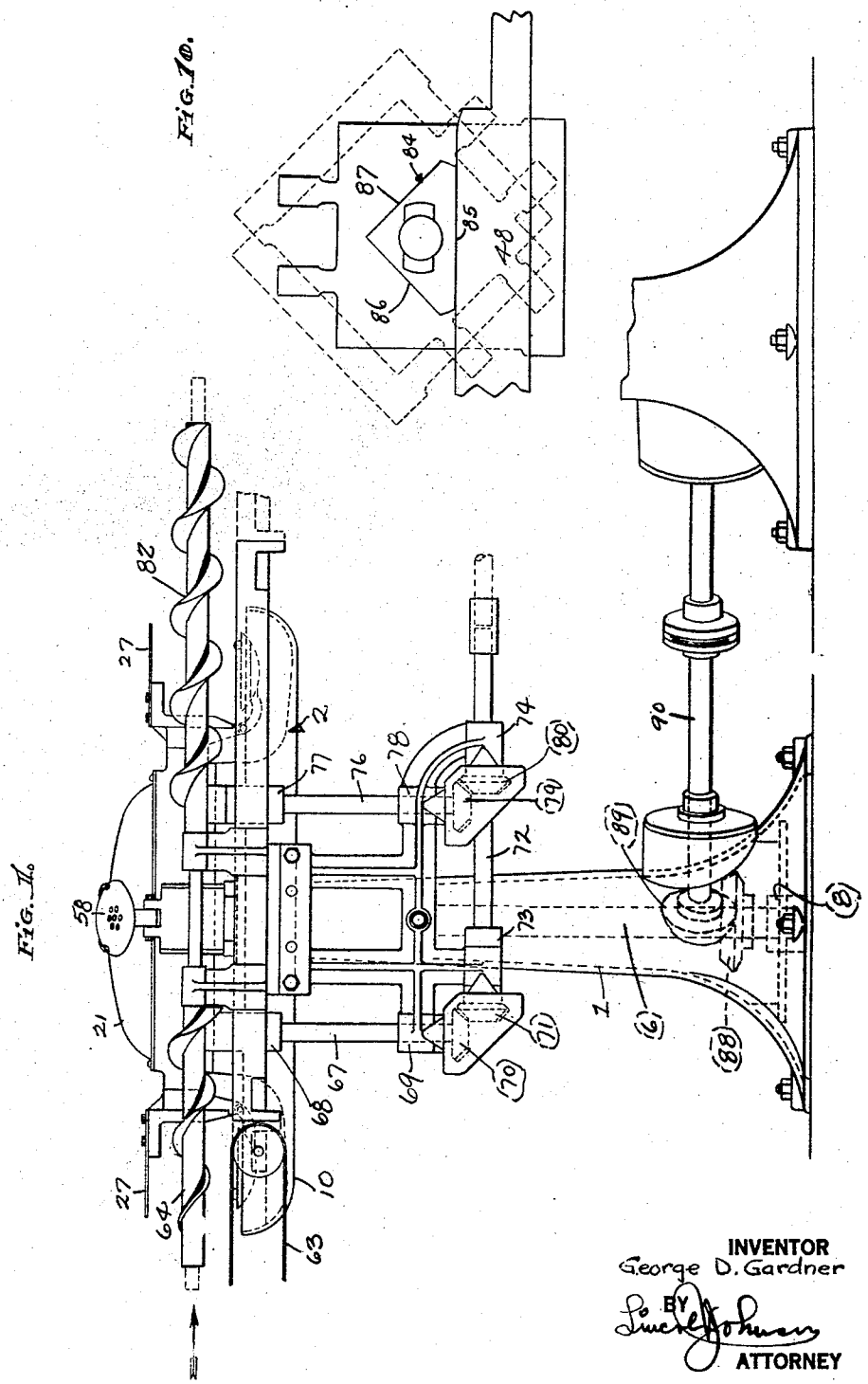
May 26, 1925. 1,539,475

G. D. GARDNER

CAN DRAINING MACHINE

Filed Nov. 6, 1924 4 Sheets-Sheet 1



INVENTOR
George D. Gardner
BY
Lucien Johnson
ATTORNEY

May 26, 1925. 1,539,475

G. D. GARDNER

CAN DRAINING MACHINE

Filed Nov. 6, 1924 4 Sheets-Sheet 2

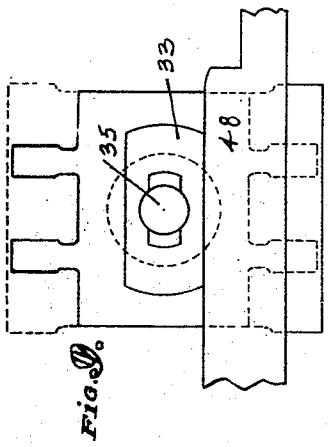


Fig. 2.

Fig. 1.

INVENTOR
George D. Gardner
BY Lincoln Johnson
ATTORNEY

May 26, 1925

1,539,475

G. D. GARDNER

CAN DRAINING MACHINE

Filed Nov. 6, 1924

4 Sheets-Sheet 3

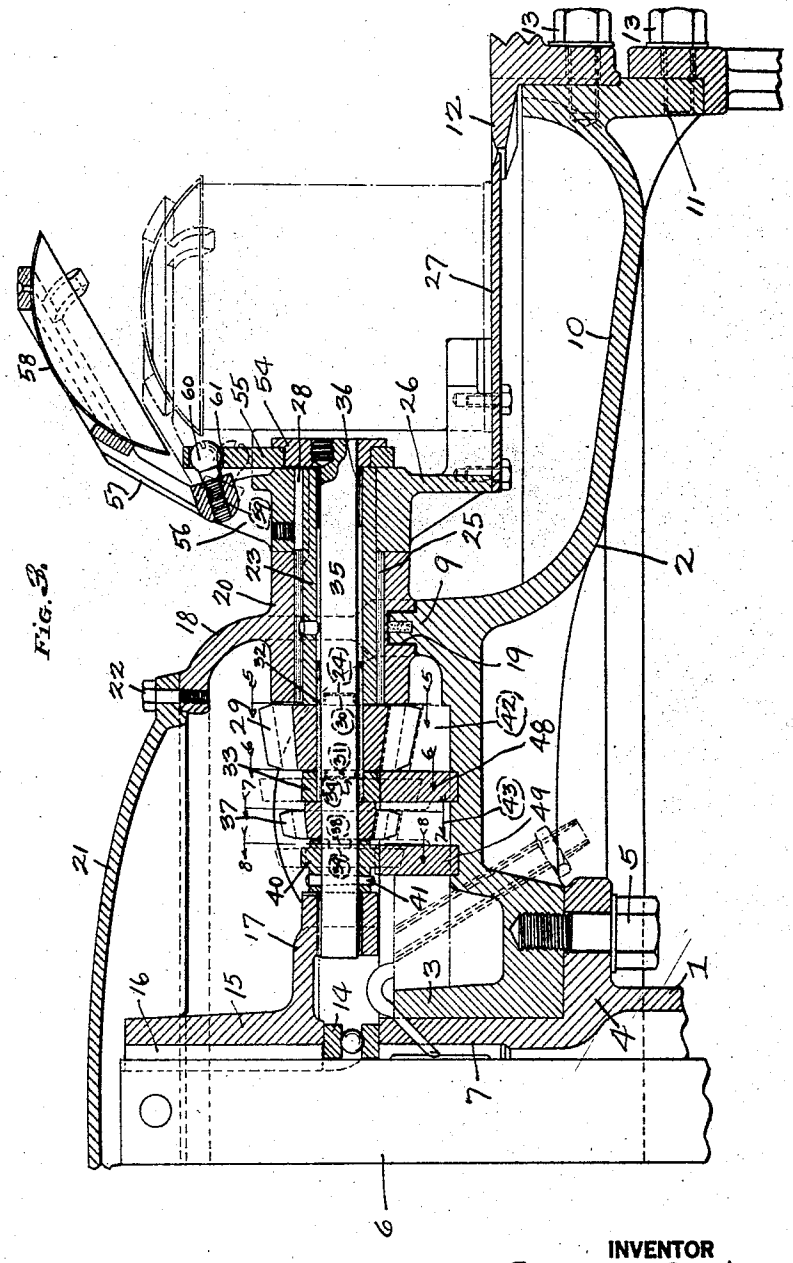


Fig. 3.

INVENTOR

George D. Gardner

BY Lindsay Thomas

ATTORNEY

May 26, 1925. 1,539,475

G. D. GARDNER

CAN DRAINING MACHINE

Filed Nov. 6, 1924 4 Sheets-Sheet 4

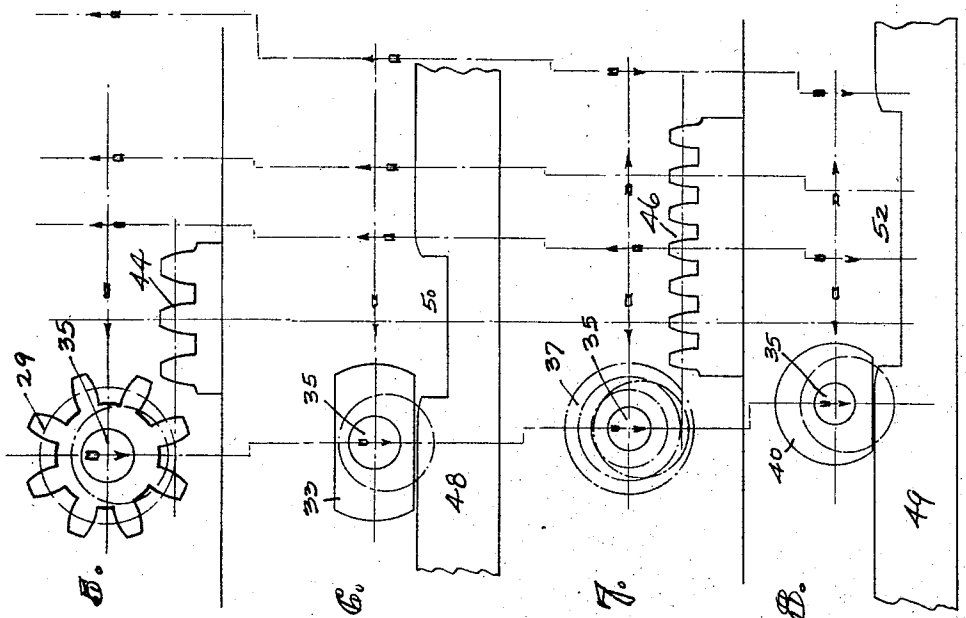


FIG. 5. FIG. 6. FIG. 7. FIG. 8.

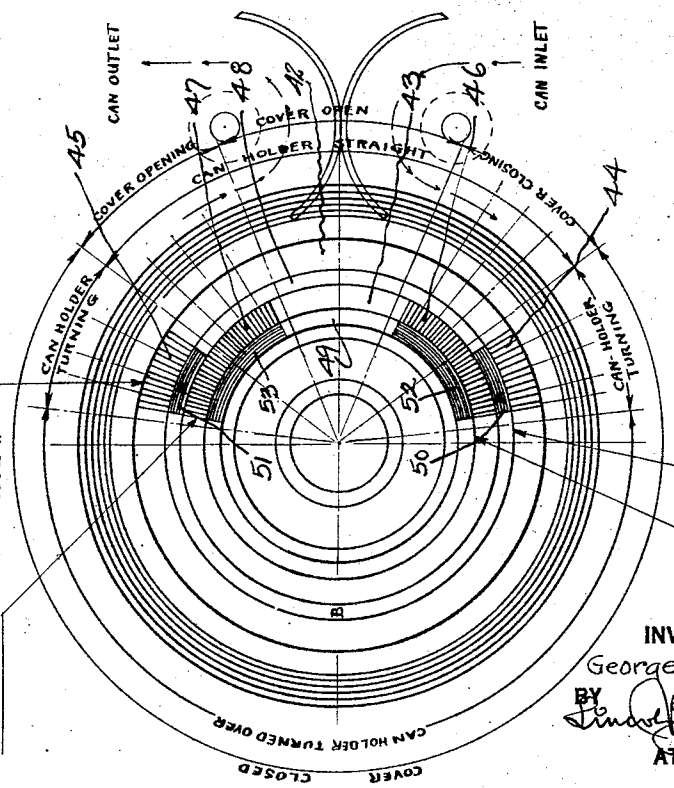


FIG. 4.

BEVEL GEAR SECTION CONTROLLING TURN OVER OF CAN HOLDER

BEVEL GEAR SECTION CONTROLLING OPENING & CLOSING OF COVER.

CAM LOCKING CAN-HOLDER IN ITS TWO (OR SEVERAL) POSITIONS.

CAM LOCKING COVER IN ITS TWO POSITIONS

INVENTOR
George D. Gardner
BY
ATTORNEY

Patented May 26, 1925. 1,539,475

UNITED STATES PATENT OFFICE.

GEORGE D. GARDNER, OF SAN JOSE, CALIFORNIA.

CAN-DRAINING MACHINE.

Application filed November 6, 1924. Serial No. 748,102.

To all whom it may concern:

Be it known that I, GEORGE D. GARDNER, a citizen of the United States, and a resident of the city of San Jose, county of Santa Clara, State of California, have made a new and useful invention—to wit, Improvements in Can-Draining Machines; and I do hereby declare the following to be a full, clear, concise, and exact description of the same.

This invention relates particularly to a machine for draining fluid from open ended vessels such as cans, bottles and the like.

An object of the invention is to provide a machine in which open ended containers, such as cans in which food-stuffs are to be preserved, may be drained of fluid either before or after the containers are filled with food-stuffs or prior to filling said containers with syrup or other preserving fluid.

A further object of the invention is to provide a can draining machine to which the cans are delivered to the draining machine on a substantially horizontal plane, and subjected to a draining operation through a substantially horizontal plane by said draining machine, and discharged onto a substantially horizontal surface.

A still further object of the invention relates to a can draining machine having can holders thereon, to which cans to be drained are delivered "open end" up and after being received in said can holders, through the operation thereof, are inverted "open end" down, or inverted into some other angular position with the "open end" of the can down, and at the completion of the draining operation are delivered "open end" up to a suitable conveyor.

Other objects of the invention are to provide can supports on a can draining machine which may be revolved into any predetermined position in conjunction with perforated can covers to be placed over the open ends of the cans, at the commencement of the draining operation for the purpose of holding the cans on the can holders and removed from the open ends of said cans at the completion of the draining operation, to permit the removal of the cans from the can holders; and to provide a can draining machine that will be superior in point of simplicity, inexpensiveness of construction, positiveness of operation, and facility and convenience in use and general efficiency.

In this specification and the annexed drawings, the invention is illustrated in the form considered to be the best, but it is to be understood that the invention is not limited to such form, because it may be embodied in other forms, and it is also to be understood that in and by the claims following the description, it is desired to cover the invention in whatsoever form it may be embodied.

In the accompanying four sheets of drawings,

Fig. 1 represents a side elevation of a can draining machine, constructed in accordance with my invention.

Fig. 2 is a plan view of Fig. 1.

Fig. 3 is an enlarged cross-section taken through Fig. 2 on the line 3—3.

Fig. 4 is a diagrammatic plan view of the gear racks and cam guides for operating the can holders and for actuating the can covers.

Fig. 5 is a diagrammatic section taken through Fig. 3 on the line 5—5.

Fig. 6 is a diagrammatic section taken through Fig. 3 on the line 6—6.

Fig. 7 is a diagrammatic section taken through Fig. 3 on the line 7—7.

Fig. 8 is a diagrammatic section taken through Fig. 3 on the line 8—8.

Fig. 9 is an elevation of the cam used to lock a can holder in a vertical position.

Fig. 10 is an elevation of a modified form of cam to lock a can holder in a vertical and angular position.

In detail, the construction illustrated in the drawings, comprises, the pedestal base 1 of a can draining machine on the upper end of which a bowl shaped platform 2 is fixedly mounted. The bowl 2 is provided with a centrally hubbed portion 3 which rests upon an annular, shoulder bearing 4 formed on the upper end of the pedestal base 1, the bowl and base being held together by means of suitable fastening screws 5. The bowl 2 is provided with an annular shoulder 9 therearound, concentric with the center of the pedestal base 1, and on the outer side of the shoulder 9 the bowl is provided with an annular, dished receptacle 10 adapted to receive and collect the fluid drained from the cans during the draining operation. The outer periphery of the bowl 2 is formed with a depending, flanged shoulder 11 thereon to which a platform 12 or other equivalent surface member might be securely held by the bolts 13.

A drive shaft 6 is arranged concentrically within the pedestal base 1 and is supported at one end in a bearing 7 positioned in the upper end of the base 1 and at its opposite end journaled in a bearing 8 mounted in the lower end of the base 1. The lower end of the drive shaft 6 has a bevel gear 88 thereon meshing with a bevel driving gear 89 fixed on an end of a power shaft 90, connected to a source of power, not shown. An anti-friction bearing 14 is arranged around the shaft 6 in contact with the upper end of the base 1 and on said bearing 14 rests an annular housing 15 which is keyed to the upper end of the shaft 6 at 16. The housing 15 is provided with a plurality of aligned and radially disposed hub bearings 17 thereon. An annular member 18 is provided with an annularly recessed lower edge 19 which is adapted to be rotatably mounted on the shouldered edge 9 of the bowl 2. The member 18 is provided with a plurality of aligned and radially disposed hub bearings 20 therein. The hub bearings 20 are equal in number to the hub bearings 17 on the member 15 and each of the hub bearings 17 and 20 are adapted to align radially. A circular cover 21 is adapted to be bolted at 22 to the upper edge of the auxiliary bearing member 18.

Hollow shafts 23, having serrated edges 24, are revolubly mounted in bearings 25 confined within each of the hub bearings 20. Can holder supports 26 having can receiving platforms 27 thereon are secured to the projecting ends of the hollow shafts 23 by the keys 28. Hollow bevel gears 29, having serrated projections 30 and 31 on the opposite faces thereof, have the projections 30 thereof locked into engagement with the serrated end edges 24 of the hollow shafts 23. The bevel gears 29 are rotatably mounted on hollow bushings 32 confined in the hollow shafts 23. Cam members 33 having serrated projections 34 thereon, are rotatably mounted on the bushings 32 with the serrated edges 34 in engagement with the serrated faces 31 on the bevel gears 29.

Shafts 35 are journaled at the inner ends thereof in the hub bearings 17 formed on the central housing member 15, the middle portion of said shafts 35 being rotatably confined in the bushings 32, and the outer ends of said shafts 35 are journaled in bushings 36 mounted in the can holder brackets 26. Bevelled gears 37 are mounted on the shafts 35 contiguous to the cams 33 and said bevel gears 37 are provided with serrated projections 38 on one face thereof with which the serrated projections 39 on the cams 40 are locked into engagement by wedge pins 41 passing through the shafts 35.

A pair of gear racks 42 and 43 are fixedly secured on the upper surface of the bowl 2, concentric to the drive shaft 6, and in registering alignment with the orbit of movement described by the bevel gears 29 and 37 in their rotation around the axis of the main drive shaft 6. The gear rack 42 is not a continuous gear rack, only fragmentary portions of gear teeth being provided at 44 and 45, for the purpose to be hereinafter described in detail. Similarly the gear rack 43 is not provided with teeth around its entire circumference, fragmentary gear teeth sections 46 and 47, only, being provided at predetermined intervals, for the purpose to be hereinafter described.

Contiguous to the gear racks 42 and 43 and interposed therebetween, a pair of cam guides 48 and 49 are concentrically positioned, each of which is in registering contact with the respective cams, 33 and 40. At all times during the orbit of movement of said cams 33 and 40 about the axis of the drive shaft 6, the cam guides 48 and 49 are intimately related to the gear racks 42 and 43 for governing and controlling the operation and actuation of the respective cams and bevel gears. In order to hold the hollow shafts 23 and shafts 35 into whatever positions the same may be placed by the respective bevel gears 29 and 37, I have arranged depressions 50 and 51 in the cam guide 48, and depressions 52 and 53 in the cam guide 49, which said depressions, in conjunction with the raised portions of the cam guides, serve to hold the hollow shafts 23 and shafts 35 in either of the horizontal or vertical or angular positions into which the same are rotated by the bevel gears 29 and 37 meshing with the toothed portions of the gear racks 42 and 43.

On the ends of the shafts 35, eccentric members 54 are secured and on which eccentric straps 55 are operatively mounted. The free ends of the straps 55 project above that portion of the can holder brackets 26 which is opposite to the can holder platforms 27. On the upper portion of the can holder brackets 26 projecting lugs 56 are formed to which the arms 57 of the perforated can covers 58 are pivotally secured at 59. Ball projections 60 are arranged on the cover arms 57, and the ball ends of said projections are operatively confined in openings 61 formed in the extended ends of the eccentric straps 55. Rotation of the shafts 35 revolves the eccentric members 54 thereabout to cause a reciprocating movement of the straps 55, which, on account of being universally connected to the can covers 58, causes said covers to move up and down, or, as in actual practice to remain suspended over the open ends of the cans and to move down into a covering position over the open ends of said cans. The toothed segments on the gear rack 43 operating through the bevel gears 37, shafts 35 and connected

mechanisms, cause the can covers 58 to be moved into closed engagement with the open ends of the cans, at the beginning of the can draining operation, and to be locked into engagement therewith during said operation through the action of the cams 40 and cam guides 49. The can covers 58 are locked over the open ends of the cans during the time that the cans are inverted for draining purposes, and said covers are released from engagement with the open ends of the cans at the completion of the can draining operation to permit the drained cans being removed from the can holders.

The rotation of the can holder by the gear 29 and racks 44 and 45 throughout two separate arcs of 180° each, is synchronously accompanied by rotation of the cover eccentric 54 through two separate arcs of movement of 180° each. The cam 40 on the shaft 35 connected to the eccentric 54 has but one flat face and is turned through 360° at each operation, whereas the cam 33 on the can holder has two flat faces and is turned through two separate arcs of 180° each at each operation.

In order to supply cans to the can holders for draining purposes, I have provided an endless belt 63 having its upper surface arranged substantially horizontal, and level with the end of the platform 12 mounted on the edge of the bowl 2. The cans are placed indiscriminately upon the belt 63 and as the cans near the draining machine, one side thereof is forced into engagement with the revolving spiral feed screw 64 which serves to space the cans apart a predetermined distance, and to advance them into position between the guide member 65 and timer 66. The timer 66 is fixedly mounted on the upper end of a shaft 67 journaled in bearings 68 and 69 secured to the pedestal base 1. A bevel gear 70 is secured to the lower end of the shaft 67 and said bevel gear meshes with a companion bevel gear 71 mounted on the end of a driving shaft 72, which is supported in bearings 73 and 74 secured to the base 1. The driving shaft 72 is connected to a source of driving power, not shown. The timer 66 is rotated in unison with the revolving of the can holders 27, so that said can holders will be supplied with cans "open end" up after the can holders come into registering communication with the space between the can guide 65 and timer 66. The cans are delivered onto the can holders in the vertical position "open end" up. As the can holders commence to revolve on a horizontal plane about the axis of the drive shaft 6, the first operation that takes place is that of the can covers 58 closing onto the open ends of the cans. This operation is brought about by the bevel gears 37 on the shafts 35 engaging the gear rack 46, and being revolved thereby which action lowers the can covers into engagement with the open ends of the cans. In unison with the lowering movement of the can covers, the cams 40, on the shafts 35, ride off of the elevated portion of the cam guide 49 into the depression 52 therein and then roll back on to the elevated portion of said cam guide to lock the can covers fixedly over the open ends of the cans. The engagement of the flattened portions of the cams 40 with the elevated surfaces of the cam guides 49 locks the can covers in either the fully opened or fully closed positions. During the time that the circular peripheries of the cams 40 enter the cam guide depression 52 the can covers are moving into or from the fully opened or fully closed positions. Immediately after the covers are closed onto the cans, the bevel gears 29 are moved into engagement with the gear rack 44, to rotate the can holders about the axes of the shafts 35. Synchronously with the bevel gears 29 and rack 44 becoming enmeshed, the cams 33 connected to said bevel gears 29 move from the elevated portion of the cam guide 48 into the depression 50 therein. The cams 33 serve to lock the can holders in a vertical position, and during the period that the cams 33 encounter the depression 50, in the cam guide 48, the can holders are permitted to revolve. Immediately after the can holders complete the turning operation, the cams 33 rise out of the depression 50 up onto the elevated portion of the guide way 48 to hold the can holders in a vertical position, preferably with the "open end" of the can down, to permit the draining thereof. The can holders continue to move around the axis of the shaft 6 in an inverted position, until such time as the bevel gears 29 engage the gear rack 45 and the cams 33 enter in the depression 51 to permit the can holders to be turned over to place the "open ends" of said cans up. Upon the starting of the can holders' turning operation the bevel gears 37 engage the gear rack 47 and the cams 40 encounter the cam depression 53 which permits the covers 58 to be elevated away from the open ends of the cans. During the remainder of the draining operation the can holders position the cans in a vertical position "open end" up with the can cover open. At the completion of the draining operation the cans are automatically removed from the can holders by a timer 75 fixedly mounted on the end of a shaft 76, journaled in bearings 77 and 78 mounted on the base 1. The lower end of the shaft 76 is provided with a bevel gear 79 thereon meshing with a companion bevel gear 80 fixed on the driving shaft 72. The timer 75 moves the cans out of the can holders into engagement with a curved can guide 81 from which the cans are moved into engagement with a spiral feed screw 82 by means of which the cans are advanced from

the platform 12 to the syruping machine indicated at 83 or into placement with any other desired form of apparatus. The draining operation of the cans, as well as the delivery and discharge of the cans to the draining machine, is carried on throughout a substantially horizontal plane, in contradistinction to conventional types of can draining machines in which the cans are discharged from the draining machine at a point either higher or lower than the can supply, or, the can draining operation takes place on a plane which varies substantially from the plane of either the can supply or can discharge.

In Fig. 10 I have shown a modified form of cam 84, substantially triangular in contour, of which one side 85 will engage the cam guide to hold the can holder in a substantially vertical position, while the remaining surfaces 86 and 87 on said cam serve to hold the cans at an angle to the vertical, whereby said cans might be drained angularly in either of two directions. Although I have shown and described cams which will maintain the can holders in the vertical position for draining purposes I do not wish to be limited exclusively thereto, inasmuch as the form of cam shown in Fig. 10 would serve to cause the functioning of my invention in an equally desirable manner.

Having thus described this invention, what I claim and desire to secure by Letters Patent is:—

1. A can draining machine comprising, can holders; means to advance cans to and from said can holders; and means to move said can holders on a substantially horizontal plane and to invert said can holders bottom end up during the period of the latter movement.

2. A can draining machine, comprising, a can feeder and a can remover arranged on a substantially common plane; and a can draining means operatively connected to said can feeder and can remover adapted to invert cans, bottom end up, between said can feeder and can remover and on substantially the same plane.

3. A can draining machine comprising, a plurality of can holders; and means for turning said can holders bottom end up on a horizontal plane.

4. A can draining machine comprising a plurality of can holders movable on a substantially horizontal plane; a can supply inlet and a can supply discharge communicating with said can holders; and means to actuate said can holders to receive a can open end up from said can supply inlet, invert said can bottom end up and discharge said can open end up to said can supply discharge.

5. A can draining machine comprising a plurality of can holders having a path of movement on a substantially horizontal plane; a can supply inlet and a can supply discharge communicating on the same plane with said can holders; and means to actuate said can holders to receive a can open end up from said can supply inlet, invert said can bottom end up and discharge said can open end up to said can supply discharge.

6. A can draining machine comprising, a drive shaft; a plurality of radially disposed driven shafts journaled in said driven shaft; can holders on each of the driven shafts; means to supply cans to said can holders; means to receive cans discharged from said holders; means to turn said drive shaft; and means to move said driven shafts and can holders throughout an arc of three hundred and sixty degrees on a substantially horizontal plane between the can supply and can discharge.

7. A can draining machine comprising, a drive shaft; a plurality of radially disposed driven shafts journaled in said drive shaft; can holders on each of the driven shafts; means to supply cans to said can holders; means to receive cans discharged from said holders; means to turn said drive shaft; means to move said driven shafts and can holders to turn said can holders into an inverted position adjacent the can supply; and means to hold said can holders in an inverted position prior to said can holders reaching the can discharge.

8. A can draining machine comprising, a base; a drive shaft rotatably mounted on said base; a bearing member secured to said drive shaft; a plurality of can holders rotatably journaled in said bearing member; means to revolve said drive shaft, bearing member and can holders; and co-engaging means on the can holders and base to turn each can holder into a plurality of positions and effect complete rotation thereof during each complete revolution of the drive shaft.

9. A can draining machine comprising, a base; a drive shaft rotatably mounted on said base; a bearing member secured to said drive shaft; a plurality of can holders rotatably journaled in said bearing member; means to revolve said drive shaft, bearing member and can holders; co-engaging means on the can holders and base to turn each can holder into a plurality of positions throughout a single revolution during each complete revolution of the drive shaft; and co-engaging means on the can holders and base to hold each can holder in said plurality of positions.

10. A can draining machine comprising, a base; a drive shaft rotatably mounted on said base; a bearing member secured to said drive shaft; a plurality of can holders rotatably journaled in said bearing member; means to revolve said drive shaft, bearing

member and can holders; and co-engaging means on the can holders and base to progressively move each can holder into an upright and inverted and upright position during a complete revolution of the drive shaft.

11. A can draining machine comprising, a base; a drive shaft rotatably mounted on said base; a bearing member secured to said drive shaft; a pluralitv of can holders rotatably journaled in said bearing member; means to revolve said drive shaft, bearing member and can holders; co-engaging means on the can holders and base to progressively move each can holder into an upright and inverted and upright position during a complete revolution of the drive shaft; and co-engaging means on the can holders and base to hold each can holder in an upright or inverted position.

12. A can draining machine comprising, a base; a drive shaft rotatably mounted on said base; a bearing member secured to said drive shaft; a plurality of can holders rotatably journaled in said bearing member; means to revolve said drive shaft, bearing member and can holders; a bevel gear on each can holder; and gear racks arranged on said base, concentrically with said drive shaft, to mesh with each can holder gear during each complete revolution of said drive shaft to progressively revolve each can holder into an upright and inverted and upright position.

13. A can draining machine comprising, a base; a drive shaft rotatably mounted on said base; a bearing member secured to said drive shaft; a plurality of can holders rotatably journaled in said bearing member; means to revolve said drive shaft, bearing member and can holders; a bevel gear on each can holder; gear racks arranged on said base, concentrically with said drive shaft, to mesh with each can holder gear during each complete revolution of said drive shaft to progressively revolve each can holder into an upright and inverted and upright position; and co-engaging means on each can holder and the base to hold each can holder in an upright or inverted position.

14. A can draining machine comprising, a base; a drive shaft rotatably mounted on said base; a bearing member secured to said drive shaft; a plurality of can holders rotatably journaled in said bearing member; means to revolve said drive shaft, bearing member and can holders; a bevel gear on each can holder; gear racks arranged on said base, concentrically with said drive shaft, to mesh with each can holder gear during each complete revolution of said drive shaft to progressively revolve each can holder into an upright and inverted and upright position; a cam member on each can holder; and a cam guide arranged on said base, concentrically with said drive shaft, to engage said can holder cam member during each complete revolution of said drive shaft to progressively maintain each can holder in an upright and inverted and upright position.

15. A can draining machine comprising, a base; a drive shaft rotatably mounted on said base; a bearing member secured to said drive shaft; a plurality of can holders rotatably journaled in said bearing member; an independent can clamp arranged on each of said can holders; means to revolve said drive shaft, bearing member, and can holders; and co-engaging means on the base and can holders to operatively actuate each can holder and can clamp and completely revolve each can holder and can clamp into a plurality of positions during each complete revolution of the drive shaft.

16. A can draining machine comprising, a base; a drive shaft rotatably mounted on said base; a bearing member secured to said drive shaft; a plurality of can holders rotatably journaled in said bearing member; an independent can clamp arranged on each of said can holders; means to revolve said drive shaft, bearing member, and can holders; co-engaging means on the base and can holders to operatively actuate each can holder and can clamp and completely revolve each can holder and can clamp into a plurality of positions during each complete revolution of the drive shaft; and means to operate each can clamp at the start and finish of the revolution of operation of each can holder.

17. A can draining machine comprising, a base; a drive shaft rotatably mounted on said base; a bearing member secured to said drive shaft; a bearing frame rotatably mounted on said base; a pair of independent gear racks on said base concentric with said drive shaft; a plurality of hollow shafts rotatably journaled in said bearing frame; a bevel gear on each of said hollow shafts enmeshed with one of said gear racks; can holders mounted on said hollow shafts; a plurality of shafts journaled in said bearing member and in said hollow shafts; a bevel gear on each of said shafts enmeshed with the other of said gear racks; can clamps on said can holders movably related to said last mentioned shafts; and means to rotate said drive shaft to actuate each of said can clamps and to revolve each of said can holders into a plurality of positions during a single revolution of said drive.

18. A can draining machine comprising, a base; a drive shaft rotatably mounted on said base; a bearing member secured to said drive shaft; a bearing frame rotatably mounted on said base; a pair of independent gear racks on said base concentric with said drive shaft; a pair of independent cam guides on said base concentric with said drive shaft; a plurality of hollow shafts ro-

tatably journaled in said bearing frame; a bevel gear on each of said hollow shafts enmeshed with one of said gear racks; a cam on each of said hollow shafts engaging one of said cam guides; can holders mounted on said hollow shafts; a plurality of shafts journaled in said bearing member and in said hollow shafts; a bevel gear on each of said shafts enmeshed with the other of said gear racks; a cam on each of said shafts engaging the other of said cam guides; can clamps on said can holders movably related to said last mentioned shafts; and means to rotate said drive shaft to actuate each of said can clamps and to revolve each of said can holders into a plurality of positions during a single revolution of said drive shaft and to hold said can clamp and can holder locked in each of said plurality of positions during the single revolution of said drive shaft.

In testimony whereof, I have hereunto set my hand at San Francisco, California this 20th day of October, 1924.

GEORGE D. GARDNER.