J. A. ANDERSON.

CHARGING AND DISCHARGING DEVICE.

APPLICATION FILED OCT. 20, 1919.

1,408,430.

Patented Mar. 7, 1922.

3 SHEETS—SHEET 1.

Fig. 2.

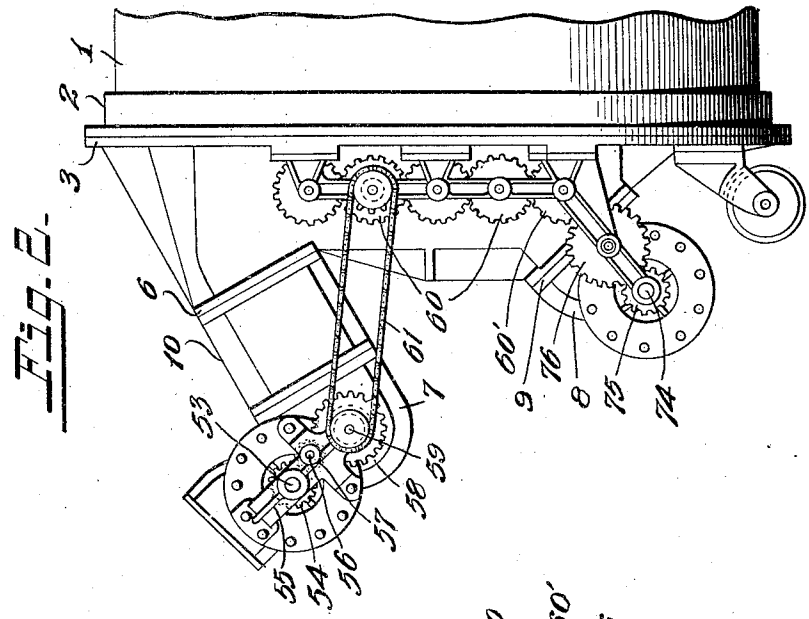
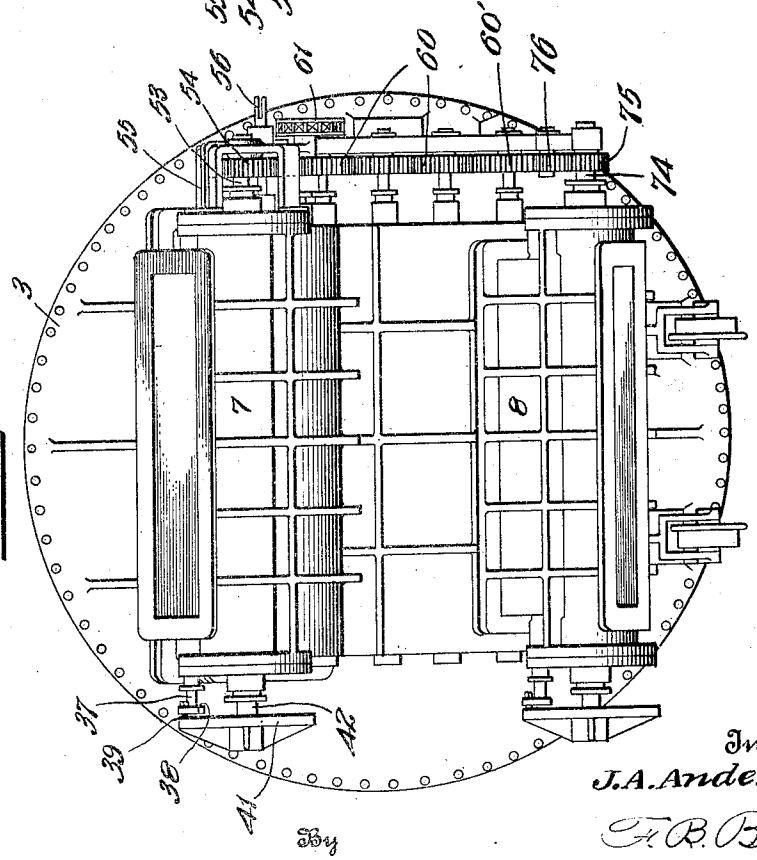



Fig. 1.




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3 SHEETS—SHEET 2.

Fig. 3.

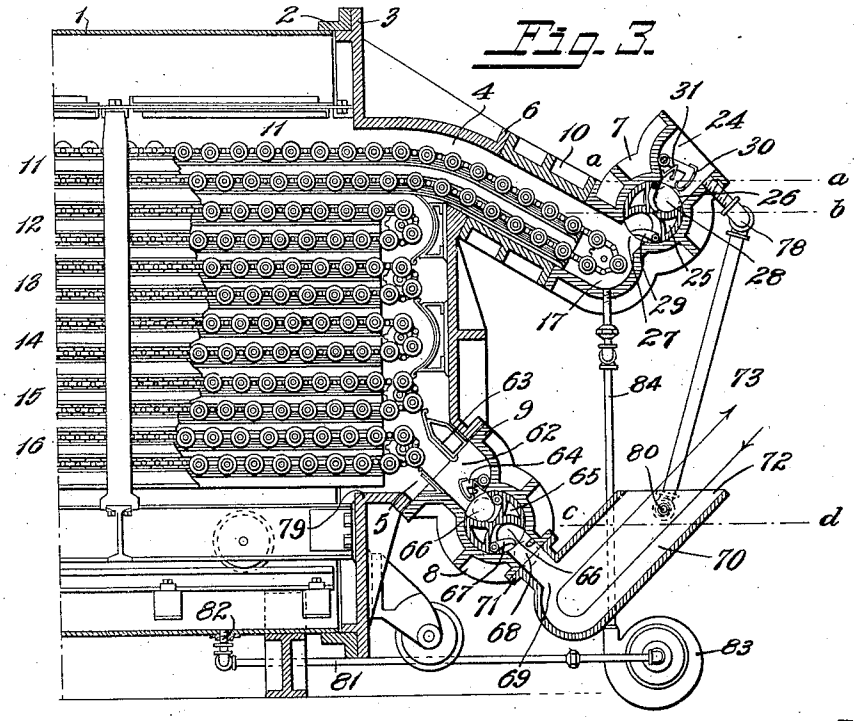



Fig. 4.

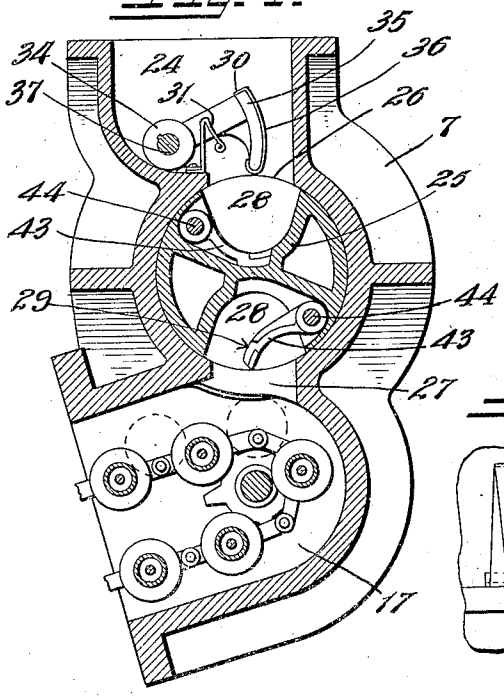



Fig. 5.

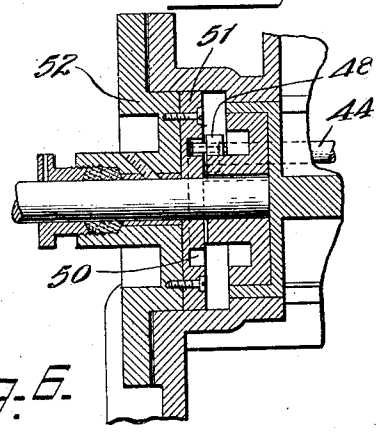
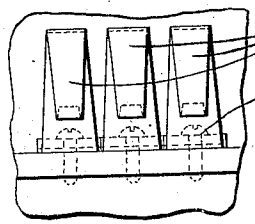



Fig. 6.




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3 SHEETS—SHEET 3.

Fig. 7.

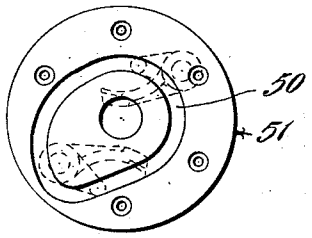



Fig. 8.

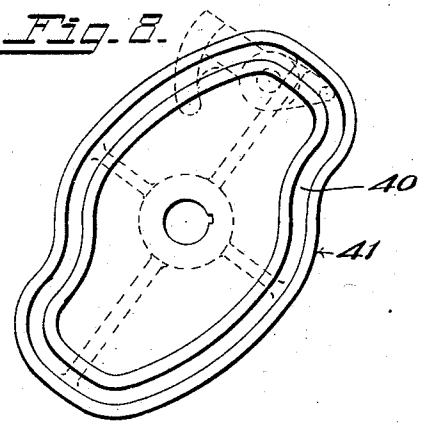



Fig. 9.

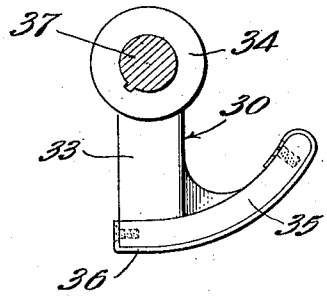



Fig. 10.

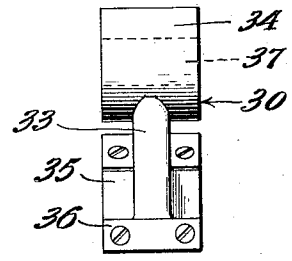



Fig. 11.

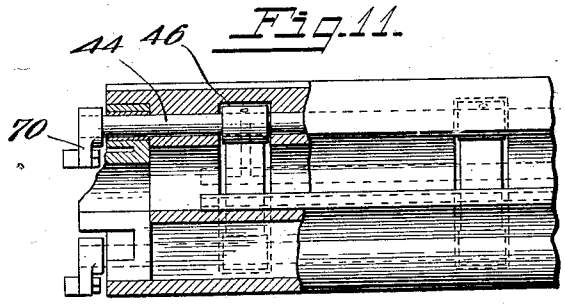



Fig. 13.

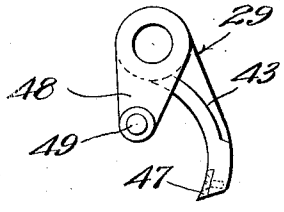
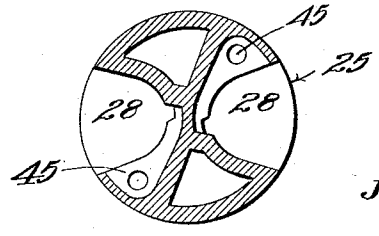



Fig. 12.




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# UNITED STATES PATENT OFFICE.

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## CHARGING AND DISCHARGING DEVICE.

1,408,430. Specification of Letters Patent. Patented Mar. 7, 1922.

Application filed October 20, 1919. Serial No. 332,100.

*To all whom it may concern:*

Be it known that I, JAMES A. ANDERSON, a citizen of the United States, and resident of Morgan, Utah, have invented certain new and useful Improvements in Charging and Discharging Devices for Sterilizers, of which the following is a specification.

The invention is specifically directed to the means for supplying filled and sealed cans to a sterilizing apparatus, and to similar means for withdrawing or discharging the sealed cans after their contents have been sterilized by suitable means as described and claimed in a co-pending application for Patent No. 256,709, filed Oct. 3, 1918.

The charging and discharging devices of the present invention are particularly adapted in apparatus employed in pressure cooking or sterilizing for canned goods, and by the utilization of the present invention any loss of steam from the sterilizer due to charging and discharging, is substantially eliminated, and consequently an economy in heat is secured.

By the utilization of my invention I improve the construction of that type of machines in which the food, or other material, is to be sterilized, in cans, and the cans are fed to and discharged from the sterilizing chamber by rotary members containing pockets to receive the cans, by providing a water seal for such rotary members having novel characteristics, and by providing improved and positive devices for feeding the cans to and from such rotary devices.

In the accompanying drawings one complete example of the physical embodiment of the invention is illustrated in connection with a sterilizing machine, the parts being combined and arranged in the charging and discharging devices, according to the best modes I have so far devised for the practical application of the principles of the invention.

Figure 1 is a front end elevation of a sterilizing machine showing the charging and discharging devices of my invention applied thereto.

Figure 2 is a side elevation of the front end of the machine shown in Figure 1.

Figure 3 is a vertical longitudinal sectional view at one end of the sterilizing machine illustrating the applicability of the charging and discharging devices for the sealed cans.

Figure 4 is an enlarged vertical sectional view of the charging or intake device, showing the rotary cylinder, its housing and other parts.

Figure 5 is an enlarged detail in vertical section of one end of one of the cam cylinders and its housing in the plane of the axes of the cylinder.

Figure 6 is a detail view of the can check springs in the charging device.

Figure 7 is a detail of one of the discharging cams and certain related parts.

Figure 8 is a detail of one of the feed cams.

Figure 9 is a detail of one of the feed devices viewed from the end of its shaft.

Figure 10 is a side view of the cam of Figure 9.

Figure 11 is a side view partly in section of one end of one of the can cylinders.

Figure 12 is a detail of one of the can cylinders in transverse sections, showing the can pockets and the recesses to receive the ejectors.

Figure 13 is a detail of one of the can ejectors.

In order that the invention may be better understood I have illustrated in the drawings a substantially cylindrical shell 1 forming part of a sterilizer for goods in cans, to which the charging and discharging devices are connected, and this shell is designed to withstand the necessary steam pressure supplied thereto for sterilizing the foods within the sealed cans.

At the front end of the sterilizer shell 1, as shown in Figure 3, the shell has a flange 2 to which is bolted a head or front plate 3 fashioned with a pair of openings 4 and 5, the former, upper opening being the intake, and the latter, lower opening being the outlet opening of the sterilizer. Adjacent the openings 5 and 6 is provided a securing flange 6 for the connection of the feed and discharge devices carried by housings 7 and 8 respectively. The housing 8 is connected to the lower flange 6 by means of a flange 9 on the housing, and the housing 7 is connected to the upper flange 6 by an intermediate hollow spacer 10. The housing 7 with its cylinder and associated parts are referred to as the intake or feed mechanism in the sense that these parts are for introducing the cans into the sterilizer or casing 1, and similarly with the housing 8 and its cylinder and other parts is for discharging

the cans from the retort or sterilizing chamber of the machine; but for each of the can cylinders there is also provided means for feeding the cans to the cylinder and discharging them from it.

Within the shell or sterilizing chamber is arranged a group of conveyor units indicated 11, 12, 13, and 14, 15, and 16, each consisting of an endless articulated belt, and the belts which are arranged one above another, are of substantially the same construction except the top one which is extended through the feed opening 4 of the head, and through the spacer 10 into the inner chamber 17 of the housing 7.

The conveyor is adapted to receive cans in rows of a suitable number, say ten cans in each row, and the conveyor and all of the can handling devices are arranged to handle the cans in rows of the stated number, receiving them from the intake and discharging them at the outlet of the sterilizer, after the contents of the cans have been sterilized or cooked. From the intake device to the outlet for the cans, they are conveyed first backward by the upper unit of the conveyer, then forward, and these movements are repeated until the cans are delivered at the front of the machine to be discharged from the retort by the discharge mechanism.

The feed and discharge mechanisms carried by housings 7 and 8 differ somewhat in detail, but are similar in principle, so that the feed mechanism will first be described and then the differences in the discharge mechanism will be pointed out.

The housing 7 has an upper outer chamber 24 in which cans are to be placed in rows by any suitable supply machine, not shown, and centrally of the housing is located the feed cylinder 25 which is machined to have a close running fit in the walls of the housing, with a port 26 leading from the outer chamber 24 to the cylinder, and an additional port 27 leads from the cylinder to the inner chamber 17. There are two longitudinal pockets 28 in the cylinder, diametrically arranged, and extending the length of the cylinder to receive a row of cans, and each pocket is provided with a can discharge device or ejector designated as a whole by the numeral 29. When the cylinder pockets are opposite the port 26, and during the travel of each pocket from that port until it is opposite to the port 27, the ejector lies under the can at the bottom of the pocket. When the pockets are opposite the inner port 27, the ejector is thrown out as shown in Figure 3 to positively eject the cans. In the further travel of the cylinder from the port 27 back to port 26, the ejector is returned to the bottom of the pockets ready for the reception of another row of cans. Located within the outer chamber 24 is a positively acting can feeding device, designated as a whole by the numeral 30, and before each row of cans is placed in the outer chamber this feed device is retracted, permitting the cans to fall against the row of check springs 31. When a cylinder pocket is opposite the port 26 the feed device is advanced to the position shown in Fig. 3, forcing the row of cans past the check springs and positively into the pocket, and the feed device is then retracted ready to receive another row of cans.

The check springs are shown in detail in Figure 6 and comprise a row of strips of spring metal 31, bent to proper shape and secured in the housing by screws 32, adjacent the port 26. The positive feed device comprises a plurality of arms 33 (Figs. 9 and 10), each having a hub 34 and an arc-shaped head 35, which may be covered with a strip 36 of rubber composition or other material to protect the cams. A row of these members is mounted at suitable intervals on shaft 37 and secured by keying, and the shaft has bearings near its ends in the housing, and at least one end of the shaft extends outside of the housing, as seen in Figure 1. Outside the housing the shaft 37 is provided with an arm 38, bearing a cam follower 39 which engages the cam groove 40 of the feed cam 41. The cam 41 is carried on a shaft 42 which is in effect the shaft of cylinder 25 and revolves with it, although for structural reasons the shaft will usually be a separate piece from the cylinder. The cam is shaped to give two oscillations of the feed shaft 37 for each rotation of the cylinder, and the movement of the heads 35 toward the pockets, of course, is timed to occur just as the pockets approach alinement with the port 26. The check springs therefore hold the cans away from contact with the surface of the cylinder until the pockets are in position to receive the cans and then the feed device positively forces the cans past the springs and into the pockets. Since the surface of the cylinder should have a polish to insure a proper running fit, this device for keeping the cans from cutting or scratching the surface is important. Each of the ejecting devices 29, comprises arms 43 keyed to a shaft 44 and this shaft has bearings 45 formed at intervals in the body of the cylinder. The hubs of the arms are accompanied by recesses 46 formed in the cylinder body, and at their outer ends the arms are recessed to carry a strip 47 which is removably connected to all of the arms so that it may be removed if worn. Preferably at one end of the cylinder the ejector shafts 44 project somewhat beyond the end of the cylinder proper, and are there provided with arms 48 carrying cam followers 49 which engage in the cam groove 50 of the discharge cam 51, which is a disk fixed in the housing and screwed to the head 52 in Fig. 5. Since

there are two ejecting elements for each cylinder, the discharge cam is designed to give a single oscillating movement for each ejector for each rotation of the drum, and is arranged so that the strip 47 is thrown away from the center of the drum or cylinder when the pockets 28 are opposite the port 27. The cans are thus positively forced out of the pockets, and immediately onto the adjacent end of the upper conveyer unit. It is possible, and preferably in some cases, although not necessary, to provide a discharge cam and cam arms on the ejector shafts at both ends of the cylinder.

At one end of the cylinder, and preferably at the end remote from feed cams 41 is provided a shaft 53 operatively integral with the cylinder and extending outside the casing, and this shaft carries a gear 54. A yoke 55 secured to one end of the housing provides a bearing for the main drive shaft 56 on which is the main drive pinion 57 engaging both gear 54 and a gear 58 secured to conveyer shaft 59. Thus from the main pinion 57 the cylinder 25 is driven, and all of the conveyer driving shafts are driven in unison in the proper relation by the train of gears 60 and sprocket transmission 61.

The discharge housing 8 has an inner chamber 62 communicating with the interior of the shell 1 of the sterilizer, and guides 63 are provided to lead cans the short distance from the discharge end of the lower conveyer to the chamber 62. A positive charging device 64 is located in the chamber 62 substantially similar to the one described in connection with the feed cylinder 25, but in this case the charging device 64 is located inwardly of the cylinder, since cans here require to be positively fed away from the interior of the shell and into the cylinder pockets. The discharge cylinder 65 is substantially identical with cylinder 25, and has can pockets 66 and positive ejecting devices 67, constructed and operated substantially like the similar devices already described.

Outwardly from the cylinder 65 the housing has a short discharge passage 68 leading to downwardly directed passage 69 of the trough like member 70 which is bolted to housing 8 by means of flanges 71. The upwardly directed portion 72 of the trough 70 receives at its bottom the cans discharged from the shell by the discharge cylinder, and it also serves as a water container for a part of the water seal, later described, and this chamber 72 also usually contains one end of a conveyer 73 serving to remove the cans from it. The discharge cylinder is provided with a feed cam 41 identical with that of the upper cylinder and other parts similarly designated, similarly constructed, and operating in a similar manner. The discharge cylinder has a shaft 74 carrying a gear 75 by which the shaft and the cylinder are driven and gear 15 is driven from gear 60′ of the lower conveyer unit by means of an intermediate idler gear 76. Thus the discharge cylinder and its related parts are driven in proper relation to the remainder of the apparatus.

Water seals are provided in connection with the cylinders to effectually prevent escape of steam from the shell 1, and at the same time act as a lubricant for the cylinders as they revolve in their housings. The cylinders are made with a reasonably close running fit, but there is some running clearance, and the water of the water seals takes up this clearance and at the low speed at which the cylinders revolve acts as an effective lubricant as well as a steam seal.

Adjacent to the feed or intake cylinder 25 water is maintained in the outer chamber 24 up to the level of line *a* and in the inner chamber 17 and the communicating passage in spacer 10 up to the level of the line *b* which is the level at which water will flow over 77 into the shell 1. The level *a* is determined by the overflow pipe 78 communicating with chamber 24. Adjacent to the discharge cylinder water is maintained in the bottom of the inner chamber 62 up to the level of the line *c* which is the level at which water will overflow into the shell at the point 79. Water is maintained in the outer chamber 72 about to the level of the line *d* and this water is supplied by the overflow pipe 78 which communicates with the chamber at 80. A pipe 81 leads from the bottom of the shell at 82 and water discharged by this pump goes through the pipe 84 to the bottom of chamber 17 adjacent to the feed cylinder. The level of water in the shell is regulated by a pipe (not shown) which communicates with the shell at the rear end, somewhat above the bottom, so that some water will always be maintained at the bottom of the shell to supply pipe 84.

As each row of cans is delivered into the chamber 17 by cylinder 25, water from the chamber fills the empty cylinder pocket and thus a pocket full of water is taken from the chamber 17 and delivered to the outer chamber 24 at each half revolution of the cylinder. As each row of cans is pushed into a cylinder pocket by the positive feed device, the remaining space is filled with water from the chamber 24 and thus a certain amount of water is returned to chamber 17 along with the cans at each half revolution of the cylinder, leaving an excess of water representing the volume of the cans, which is pumped outwardly by the cylinder at each half revolution. This excess flows away through pipe 78 to chamber 72. The action of the discharge cylinder is substantially a reversal of the action of the feed cylinder, that is, at each half revolution it pumps an amount of water equal to the volume of the cans from

the chamber 72 into the inner chamber 62 and the excess flows over the ledge 79 into the shell. There is thus substantially no difference in the volume of water handled by the charging and discharging cylinders. Since each of the cylinders is completely submerged in water at both sides, there is no chance for either air or steam to get into the cylinder pockets. The loss of steam is thus practically zero, and the heat efficiency of the apparatus is very high.

In one embodiment of the machine is designed to run at such speed that 100 cans are fed into and discharged from the shell per minute. A desirable cooking period for food such as peas, which require thorough cooking under pressure to resist the internal pressure developed in the cans, is 18 minutes, and with the rate of feed above mentioned therefore, the area of the conveyer system is designed to accommodate 1800 cans, and the speed of each of the cylinders will be five revolutions per minute.

It will be understood that while the feed and discharge devices and the water seal arrangement may in some cases be valuable independently of each other, they co-operate very advantageously since the positive can handling devices easily overcome any disturbances of normal movement of the cans, which might be caused by the necessity of moving them through a body of water at each side of each cylinder. Either the feed or the discharge cylinder with its associated parts has novel features of utility in other adaptations for handling cans or similar articles, and especially when the articles are to be handled in connection with the water seal such as described.

I claim—

1. In a charging device, the combination of a pocketed can-cylinder, a housing, and a water seal at each side of the cylinder, and means for moving cans into the cylinder pockets.

2. In a charging device, the combination of a pocketed can-cylinder, a housing therefor and a water seal at each side of the cylinder, means for moving cans into the cylinder pockets, and means for discharging cans from the cylinder pockets.

3. In a charging device, the combination with the housing, of a pocketed cylinder for feeding cans, and a water seal at each side of the cylinder, and positive means for ejecting cans from the cylinder pockets.

4. In a charging device, the combination with the housing, of a rotary pocketed can-cylinder, a water seal at one side of the cylinder, and positive means for moving cans through the water seal into the cylinder pocket.

5. The combination with the housing, of a rotary pocketed can-cylinder having a water seal at each side thereof, positive means for moving cans through the water seal into the cylinder pocket, and positive means for discharging cans from the cylinder pocket through the water seal.

6. The combination with the housing, of a rotary pocketed can-cylinder, a check spring to temporarily retain cans out of contact with the cylinder, positive means for forcing cans past the check spring into the cylinder pocket, and said housing containing a water seal at the side of the cylinder adjacent the check spring and positive feed device.

7. In a charging device the combination with a housing of a rotary pocketed can-handling cylinder and water supply passage to the housing providing a water seal submerging the cylinder pockets, and another passage away from the other side of the cylinder providing a seal submerging the cylinder pockets.

8. In a charging device, the combination with a housing, of a rotary, pocketed, can-handling cylinder and water supply passage to the housing providing a water seal submerging the cylinder pockets, another passage leading away from the opposite side of the cylinder providing a water seal submerging the cylinder pockets, and positive means for feeding cans through the water seal into the cylinder pockets at one side of the cylinder.

9. The combination with the housing of a rotary pocketed can-handling cylinder and water supply passage to the housing providing a water seal submerging the cylinder pockets, a passage leading away from the other side of the cylinder providing a seal submerging the cylinder pockets, and means for positively ejecting cans from the cylinder pockets into the water seal at one side of the cylinder.

10. The combination with the housing, of a rotary pocketed cylinder and water supply passage to the housing providing a seal submerging the cylinder pockets, a passage leading away from the other side of the cylinder providing a seal submerging the cylinder pockets, means for positively moving cans through the water seal into the cylinder pockets at one side of the cylinder, and positive means for ejecting the cans from the cylinder pockets into the water seal at the other side of the cylinder.

11. The combination with the housing forming an elbowed passage and a water seal therein, of a pocketed can-cylinder rotatably mounted in one branch of said passage and above the bottom of the passage.

12. The combination with the housing forming an elbowed passage and a water seal therein, of a pocketed can-cylinder rotatably mounted in one branch of said passage and above the bottom of the passage, and means

located in the branch of the passage above the cylinder for positively feeding cans into the pockets.

13. The combination with the housing forming an elbowed passage and a water seal therein, of a pocketed can-cylinder rotatably mounted in one branch of said passage and above the bottom of the passage, means located in the branch of the passage above the cylinder for positively feeding cans into the pockets, and means for positively ejecting cans from the cylinder pockets into the branch of the passage below the cylinder.

14. The combination with the housing forming a supply and discharge passage and a water seal in each passage, a rotary pocketed can-cylinder in one passage beneath the water seal, and positive means for feeding cans to and from the cylinder pockets.

JAMES A. ANDERSON.