

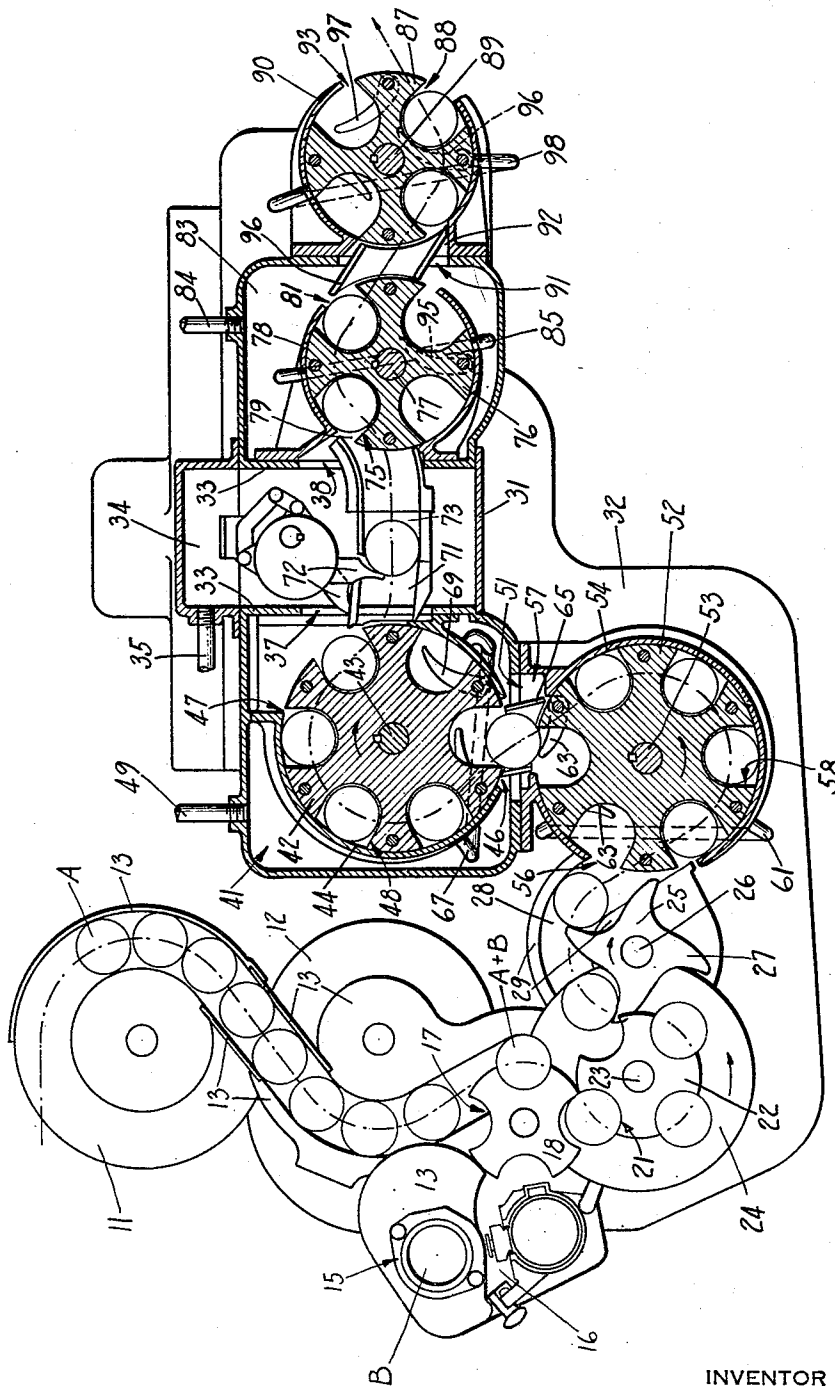
May 19, 1942.

W. K. CABOT

2,283,181

CAN CLOSING MACHINE

Filed June 30, 1939



INVENTOR
Walter K. Cabot
BY *Ernest W. Thompson*
Charles H. Clegg
ATTORNEYS

UNITED STATES PATENT OFFICE

2,283,181

CAN CLOSING MACHINE

Walter K. Cabot, Montclair, N. J., assignor to
American Can Company, New York, N. Y., a
corporation of New Jersey

Application June 30, 1939, Serial No. 282,285

4 Claims. (Cl. 226—82)

The present invention relates to vacuum can closing or sealing machines and the like and has particular reference to maintaining a super-high vacuum within the can closing chamber of the machine.

An object of the invention is the provision of a vacuum can closing machine wherein leakage of air from the atmosphere into the can closing chamber of the machine is minimized to such an extent that a uniformly super-high vacuum may be readily maintained within the machine chamber at all times.

Another object is the provision of such a can closing machine wherein atmospheric air brought into the machine with the entering cans is exhausted from the machine before the can is introduced into the can closing chamber so that the entrance and discharge of cans into and from the chamber in no way affects the super-high vacuum maintained within the chamber.

Another object is the provision of a vacuum can closing machine of this character wherein internal valves, separating a plurality of main and auxiliary vacuum chambers which are exhausted to increasing and decreasing degrees of vacuum, are utilized to protect an innermost highly vacuumized closing chamber against fluctuations in its vacuumized condition.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawing, discloses a preferred embodiment thereof.

Referring to the drawing, the single figure illustrates a plan view of a vacuum can closing machine embodying the instant invention, a part of the machine being shown in horizontal section.

As a preferred embodiment of the invention the drawing illustrates the principal parts of a vacuum can closing machine of the character disclosed in United States Patent 1,670,925, issued May 22, 1928, to N. P. Bach, on "Vacuum can sealing machine and method." For the purpose of this specification the machine is preferably divided into a can and cover feeding section and a vacuumizing and can sealing section.

In such a machine filled cans A and can covers B are brought together in the feeding section from separate sources of supply and while the covers are held in suspension over the cans both cans and covers are introduced into the vacuumizing and closing section of the machine. In the vacuumizing section air brought in with the cans and their covers is nearly all removed prior to the

introduction of the cans and covers into a highly vacuumized closing chamber where the remaining air is exhausted and the covers sealed onto the cans.

5 The sealed cans are then passed into a chamber having a lower vacuumized atmosphere before being discharged from the machine. The super-highly vacuumized closing chamber is thus protected against the entrance of air thereinto by the lower vacuumized chambers which are located on either side of it. This prevents fluctuations in the vacuum condition of the closing chamber and thus provides for better vacuumizing and sealing of the cans.

15 In the feeding section of the machine cans A to be vacuumized and sealed are preferably received on a constantly rotating feed-in disc 11 and are advanced by an auxiliary feed-in disc 12 in a continuous procession along a sinuous path of travel toward the can vacuumizing section of the machine. Parallel curved and straight side guides 13 maintain the moving cans in a single line.

25 The can covers B are preferably individually fed from a supply stack 15 included in a cover feeding device 16 of the character disclosed in United States Patent 2,102,605, issued December 21, 1937, to N. B. Bach on "Can and cover feeding mechanism." This feeding device is preferably located adjacent the path of travel of the cans moving across the auxiliary feeding disc 12.

30 The fed covers B are received in spaced pockets 17 of a rotating feed turret 18 and are carried by the turret into a position above the path of travel of the moving cans A. The turret is also provided with can pockets which are below and which register with the cover pockets and hence as a cover is aligned over the foremost moving can in the procession this can is picked up or received by the turret pocket and both can and cover advance simultaneously.

35 The can A and its superimposed cover B are received from the feed turret 18 in spaced pockets 21 of a rotating timing turret 22 carried on a vertical shaft 23 which also carries a disc 24 for supporting the cans. The timing turret properly spaces adjacent cans in the procession and accelerates them to a desired speed in preparation for their entrance into the vacuum section of the machine.

50 The timed and accelerated cans and their covers are delivered into the vacuumizing section of the machine by a rotating star-wheel 25 mounted on a shaft 26. The star-wheel is provided with spaced prongs 27 which engage behind a can and

its cover and sweep them out of a passing pocket 21 of the timing turret as the latter rotates. The star-wheel moves the cans and covers across a stationary platform 28, the covers being supported and guided by curved guide rails 29.

The vacuumizing section of the machine includes a housing 31 which is mounted on a main frame 32. The housing is partitioned off to provide a plurality of chambers which are maintained under vacuum of different degrees. The central portion of the housing is provided with spaced and parallel partition walls 33 which together with the housing outer walls enclose a can sealing chamber 34. This chamber is maintained under a high degree of vacuum of preferably 29.75 inches.

Air is withdrawn by way of a pipe 35 communicating with the chamber to produce the desired vacuum. One end of the pipe is threaded into a wall of the housing while its opposite end leads to a suitable source of vacuum such as a tank or a pump. Openings 37, 38 in the partition walls 33 permit of passing the cans and covers through the chamber.

The vacuumized condition of the closing chamber 34 is protected against fluctuations by auxiliary vacuum chambers disposed on each side of the closing chamber as hereinbefore mentioned. On the can and cover entrance side (the left as viewed in the drawing) there is provided in the housing 31 a pre-vacuumizing chamber 41 which is isolated from the closing chamber by a rotary transfer valve 42 mounted on a vertical shaft 43 and located in a cylindrical valve seat 44 which surrounds the valve.

The valve seat 44 is in substance a partition wall which separates the prevacuumizing chamber from the closing chamber. Can and cover entrance and exit ports 46, 47 are provided in the valve seat and spaced pockets 48 are provided in the valve for receiving the cans and covers. A prevacuumizing condition of between 20 to 26 inches of vacuum is maintained in this chamber by the use of a pipe 49 which leads to the source of vacuum.

An opening 51 in a wall of the housing 31 is provided for the entrance of cans and covers into the prevacuumizing chamber. This opening is protected against the entrance of the outside atmospheric air by a rotary entrance valve 52 which is mounted on a vertical shaft 53. The valve 52 rotates in a cylindrical valve seat 54 which is secured to the side of the housing 31 adjacent the opening 51. Entrance and exit ports 56, 57, respectively, are provided in the seat for the passage of cans and covers therethrough and spaced pockets 58 are provided in the valve for the cans and covers.

Thus when a can A and its superimposed cover B are transferred by the star-wheel 25 from the feed-in section of the machine into the vacuumizing section, the can and cover pass through the entrance port 56 of the entrance valve seat 54 and are deposited in a passing pocket 58 of the valve. Some of the air taken into the valve pocket along with the can is immediately dissipated as soon as the pocket is cut-off by the valve seat from communication with the atmosphere.

The partial dissipation of the incoming air is preferably effected by a by-pass pipe 61 the ends of which are secured in the valve seat, one on each side of the entrance port. The ends of this pipe are located so that a pocket bringing air and a can and cover into the machine will align with the end of the by-pass at the same time that an

empty vacuumized pocket which has just delivered its can and cover into the prevacuumizing chamber will align with the other end of the by-pass. Thus air in the incoming pocket will flow through the by-pass and into the vacuumized pocket and thereby equalize the pressures in both pockets. Hence only a portion of the incoming air is actually carried into the prevacuumizing chamber.

A can and its cover in a pocket 58 of the entrance valve 52 is carried around toward the exit port 57 of the valve seat and is there delivered by the valve into the prevacuumizing chamber. Delivery of the can and its cover is effected by a finger 63 which is located in the valve pocket. There is one of these fingers in each valve pocket and they are operated in any suitable manner, such as by a cam or the like. Such a construction is common in valves of this character.

The valve finger 63 in delivering the can and its cover into the vacuum chamber 41 through the housing opening 51 sweeps each can and cover across a guideway 65 disposed in the housing opening and pushes the same into a passing pocket 48 of the transfer valve 42. It is during this transfer of the can that it is prevacuumized.

The transfer valve 42 carries its can and cover toward the can closing chamber 34. During this passage more of the air remaining in the valve pocket in which the can and cover are disposed, is dissipated in the same manner as described in connection with the entrance valve. This is accomplished by a by-pass pipe 67 the ends of which are secured in the valve seat 44 on opposite sides of the seat entrance port 46 in the same way as in the by-pass feature of the entrance valve seat 54.

When the pocket of the valve 42 comes adjacent the seat exit port 47, fingers 69 similar to those located in the entrance valve pockets, push the can and cover out into the can closing or sealing chamber 34. The can and its cover are received on a runway 71 which extends across the closing chamber. The can and cover are propelled along this runway by cam operated fingers 72 disposed in the chamber. These fingers and their mode of operation are described in detail in the first mentioned Bach patent.

Near the center of the runway the can and cover are brought to rest on a lifter plate 73 which operates to lift both the can and its cover up into a closing mechanism such as a seaming head or the like located directly above the lifter plate and within the chamber. Such a closing mechanism is disclosed in the first mentioned Bach patent and it is this mechanism which unites the cover with the can.

After being closed the can is lowered by the lifter plate 73 to its original level and the feed fingers 72 again operate to discharge the can by way of the runway 71 from the closing chamber 34. The closed can is pushed out through the chamber exit opening 38 and is received in a passing pocket 75 of a rotary auxiliary transfer valve 76. The valve is carried on a vertical shaft 77 and is disposed within a valve seat 78 secured to the adjacent partition wall 33. The valve seat is provided with an entrance port 79 through which the closed can passes upon being introduced into the valve pocket and an exit port 81 through which the closed can is delivered as the valve rotates.

The auxiliary transfer valve 76 and its seat 78 close off the discharge side of the closing chamber 34 from a discharge chamber 83 which

is located in the housing 31. This chamber is maintained under a vacuum of approximately 26 inches by way of a communicating pipe 84 which leads to the source of supply of vacuum.

The closed can thus introduced into the discharge chamber is subjected to a slight pressure over that maintained in the closing chamber but yet is a lower pressure than that of the outside atmosphere. It is this vacuumized discharge chamber which prevents the outside atmospheric air from leaking into the closing chamber from the exit side of the machine.

A by-pass pipe 85 having its ends secured in the valve seat 78 adjacent to and on opposite sides of the exit port 81 serves in the same capacity as the by-pass pipes 61, 67 on the other valve seats to prevent air within the discharge chamber from being carried into the closing chamber.

The vacuum maintained within the discharge chamber 83 is prevented from being dissipated when the closed can is discharged therefrom by a discharge valve 87 having spaced can pockets 88. This valve is mounted on a vertical shaft 89 and is disposed in a cylindrical seat 90 secured to the end wall of the housing 31 adjacent to and surrounding a discharge or can exit opening 91 formed therein. This valve seat is provided with entrance and exit ports 92, 93, respectively. The entrance port is in communication with the chamber opening 91 while the exit port leads to atmosphere.

A closed can in a pocket of the auxiliary transfer valve 76 is delivered into the discharge chamber 83 by fingers 95 which are similar to the fingers 63, 69 in the entrance valve 52 and the transfer valve 42. The fingers 95 sweep the can across a guideway 96 located in the discharge chamber opening 91 and push it through the valve seat entrance port 92 and into a passing pocket 88 of the discharge valve 87. The valve 87 carries the can adjacent the seat exit port 93 where valve fingers 97, similar to the fingers 63, 69, 95, discharge the cans from the valve. It is then in the atmosphere and may be further moved as desired to any suitable place of deposit.

A by-pass pipe 98 having its ends secured in the discharge valve seat 90 adjacent its exit port 93 acts in the same manner as the other by-pass pipes hereinbefore mentioned to partially dissipate atmospheric air entering with the empty pockets of the valve before the pockets communicate with the vacuumized discharge chamber 83.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. In a vacuum can closing machine, the combination of a housing having can entrance and can discharge openings therein adjacent opposite portions thereof, outer valve seats disposed exteriorly of said housing adjacent and surrounding said openings, outer rotary valves having spaced pockets mounted in said seats for preventing air from entering said housing, partition walls formed with entrance and exit openings located inside said housing and setting off therebetween a highly vacuumized can closing chamber adapted to receive cans and covers from the pockets of one of said valves and to

seal the cans while in said chamber, inner valve seats formed with entrance and exit ports also located within said housing adjacent said partition wall openings, and inner rotary valves having spaced pockets mounted in said seats, said inner valve seats setting off an auxiliary prevacuumizing chamber on one side of the closing chamber and an auxiliary sealed can discharge chamber on the other side, and means for maintaining said auxiliary chambers under a lesser vacuum than that obtaining in said closing chamber for protecting the closing chamber against fluctuations in its highly vacuumized condition.

2. In a vacuum can closing machine, the combination of a housing, partition walls in said housing setting off therebetween a highly vacuumized can sealing chamber with a can prevacuumizing chamber on one side thereof and a sealed can discharge vacuumizing chamber on the other side for protecting said closing chamber against fluctuations in its highly vacuumized condition, said partition walls and said housing having openings through which cans and covers and sealed cans may be passed into and out of said chambers, means for passing said cans and covers through said sealing chamber in a substantially straight path of travel during the sealing operation, inner valve seats disposed adjacent the openings in said partition walls and carrying valves having pockets for sealing off said chambers one from the other, and outer valve seats disposed adjacent the openings in said housing and carrying valves having pockets for sealing off said chambers from the outside atmosphere thereby protecting said prevacuumizing chamber and said can discharge chamber from the outside atmosphere.

3. In a vacuum can closing machine, the combination of a housing having can entrance and can discharge openings therein, entrance and exit valves having spaced pockets disposed in said housing openings for conveying cans into and out of said housing while excluding atmospheric air therefrom, can feeding devices adjacent said housing for feeding cans, cover feeding devices for bringing can covers into superimposed position relative to said fed cans, timing instrumentalities for said cans and covers, means for introducing said timed cans and covers into a pocket of said entrance valve, partition walls having entrance and exit openings in said housing and setting off a highly vacuumized can closing chamber for the reception of cans for sealing, inner entrance and exit valves having spaced pockets adjacent said partition wall openings and setting off a vacuumizing chamber on each side of said closing chamber, said vacuumizing chambers being maintained under a lesser vacuum than said closing chamber for protecting the latter against fluctuations in its highly vacuumized condition.

4. In a vacuum can closing machine, the combination of a housing having can entrance and can discharge openings therein, outer valve seats having can entrance and can exit ports adjacent said openings, outer rotary can entrance and exit valves having spaced pockets mounted in said valve seats, partition walls having can entrance and exit openings in said housing and setting off therebetween a highly vacuumized can closing chamber, inner valve seats having can entrance and exit ports adjacent said partition openings, inner rotary valves having spaced

pockets in said inner seats, said inner valves and their seats setting off an auxiliary vacuumizing chamber on each side of said closing chamber, means for separately feeding cans and covers in timed relation into predetermined position in respect to each other, means for introducing said timed cans and covers successively into the pockets of said outer can entrance valve, means for maintaining said auxiliary chambers under a

5 lesser vacuum than that obtaining in said closing chamber for protecting the latter against fluctuations in its highly vacuumized condition, and by-pass pipes associated with said rotary-valve seats and communicating with the moving pockets of said valves while they are isolated by said valve seats for dissipating pocketed air being carried into the adjacent vacuum chamber.

WALTER K. CABOT.