April 20, 1943. L. H. LOCKWOOD 2,317,330

APPARATUS FOR MAKING CLOSURES

Filed May 7, 1940

Fig. 1

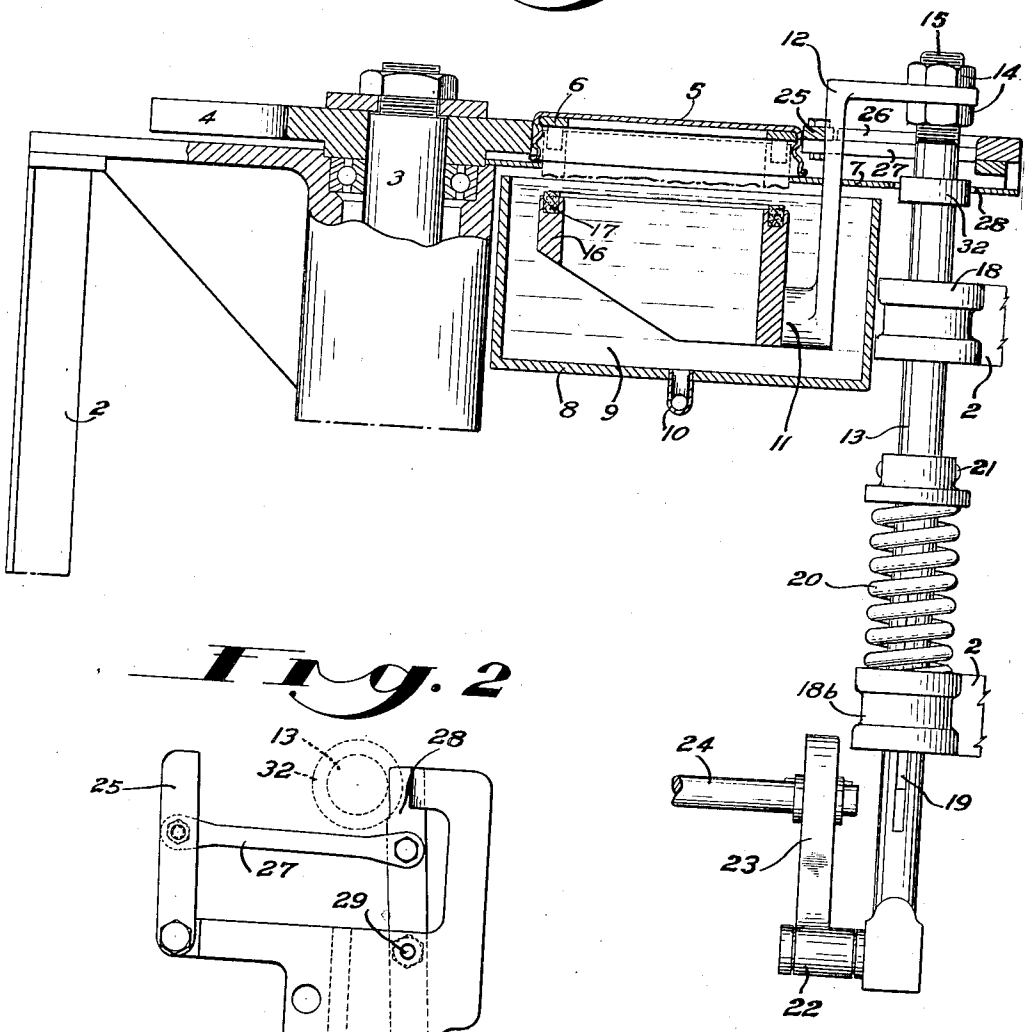

Fig. 2

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APPARATUS FOR MAKING CLOSURES

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10 Claims. (Cl. 91—47)

This invention relates to apparatus for making closures and, more particularly, to an apparatus adapted to apply a coating of ultra-accelerator solution to a rubber sealing liner while it is contained in a closure. The term "sealing liner" is used broadly herein and is intended to include within its scope rings, disks, gaskets, washers, packings, annuluses, and the like.

In the copending application of Frank H. Carman and Wallace L. MacKinnon, Serial No. 333,726, filed May 7, 1940, entitled Method of making closures, there is disclosed a method of making closures in which a coating of ultra-accelerator solution is applied to an unvulcanized rubber sealing liner while it is contained in a closure, and then the coated liner while it is contained in the closure is heated to vulcanizing temperature to cure or vulcanize the liner. Such procedure greatly decreases the time heretofore required for the vulcanizing operation and permits a more satisfactory sealing liner to be obtained.

The chief object of my invention is to provide a device for use in such process which efficiently and satisfactorily applies a coating of ultra-accelerator solution to an unvulcanized rubber sealing liner while it is contained in a closure. An object of my invention is to provide a device for attachment to the closure manufacturing equipment commonly used in the industry which quickly, easily and accurately applies the coating. A further object is to provide a device which applies the coating automatically and successively to a plurality of sealing liners contained in closures. A still further object is to provide a device in which an applying member is yieldingly urged toward a positioned sealing liner to apply a coating thereto and in which such member is returned to original position after the coating has been applied.

This invention relates to a device for applying a liquid coating to the exposed face of a sealing liner assembled with a closure element and comprises in combination a support for positioning a closure element with its sealing liner disposed in substantially horizontal plane above a liquid bath, an applicator for transferring liquid from the bath to the liner upon contact therewith, and means for moving the applicator through the bath and into contact with the exposed surface of the liner.

The attached drawing illustrates a preferred embodiment of my invention, in which

Figure 1 is a sectional view of my coating applying device; and

Figure 2 is a plan view of a stop mechanism used therewith.

Referring to the drawing, there is shown a supporting frame 2 carrying a rotatory shaft 3 to which is secured a star-wheel 4 which places a closure 5 carrying an unvulcanized rubber sealing liner 6 in predetermined position to receive a coating of ultra-accelerator solution. The closure 5 carrying the sealing liner 6 is held by the star-wheel 4 in predetermined position on a plate 7 having an opening therein. Below the opening in the plate 7 is mounted a tank 8 filled with the ultra-accelerator solution 9. The tank 8 is provided with an inlet 10 through which additional solution 9 may be fed to maintain the solution in the tank 8 at a predetermined level. Within the tank 8 is placed an annular, cylindrical, pad-holding member 11 mounted on an arm 12 which extends upwardly beyond the tank 8 and then outwardly and is mounted upon a vertically extending rod 13 and held thereon in predetermined position by means of nuts 14 engaging the threaded portion 15 of the rod 12. The wall 16 of the annular, cylindrical member 11 is provided with a channel in its upper surface, such channel being filled by an annular applicator or pad 17 which completely fills the channel and extends upwardly to some extent beyond the wall 16. The pad 17, preferably, is formed of porous, compressible, absorbent felt and is used to apply a coating of ultra-accelerator solution to the sealing liner 6 as hereinafter described. The amount of solution applied to the liner 6 may be controlled to some extent by careful selection of the pad 17. I have found a soft, highly porous or absorbent felt pad will apply a greater amount of solution to the liner 6 than a felt pad which is not so porous or absorbent and which is relatively stiff or unyielding. The pad 17 used in my device is chosen according to the amount of solution it is desired to apply to the ring 6. In retracted position, as shown in Figure 1, the pad 17 is so mounted within the tank 8 that it is below the level of the ultra-accelerator solution 9 to ensure the transfer of an adequate coating to the liner 6.

The rod 13 is secured to the frame 2 by means of supports 18 and 18b surrounding it and which are secured to the frame 2. The support 18b is provided with a key 19 adapted to fit within a slot provided in the rod 13, thus maintaining the rod in proper position and serving to prevent any rotary movement thereof which would misalign the pad-holding member 11. A coil spring 20 surrounds the rod 13 and is placed between

the support 18b and a collar 21 secured to the rod 13. The spring 20 serves to normally move the rod 13 upwardly, thus elevating the pad-holding member 11 and permitting the pad 17 to apply a coating of ultra-accelerator solution to the sealing liner 6. A cam follower 22 is connected to the bottom of the rod 13 and engages a cam 23 mounted on a shaft 24 connected to any suitable source of power. The cam 23 acting through the cam follower 22 connected to the rod 13 serves to positively retract the pad-holding member 11 and to hold it in lowered position below the sealing liner 6 and in the bath 9.

The liner coating mechanism is normally held in lowered position by the cam 23. When the mechanism is in such position, the coil spring 20 is compressed to some extent between the support 18b and the collar 21. Upon rotation of the cam 23 the coil spring 20 expands, raising the rod 13 carrying the pad-holding member 11 thus placing the pad 17 in engagement with the aligned sealing liner 6 carried by the closure 5 and applying a coating of ultra-accelerator solution thereto. The position of the pad 17 at such time is shown in dotted outline in the drawing. Continued rotation of the cam 23 forces the rod 13 downwardly, thus removing the pad 17 from engagement with the sealing liner 6 against the resistance of the spring 20 and compressing the spring 20 between the support 18b and the collar 21. Rotation of cam 23 is synchronized with rotation of the star-wheel 4. Further rotation of the cam 23, of course, repeats the process and applies a coating of ultra-accelerator solution to a second sealing liner.

It is desirable that some means be provided to prevent upward movement of the pad 17 if inadvertently a closure has not been placed in predetermined position by the star-wheel 4. I provide a trigger 25 positioned above the tank 8 and pivoted to a support 26 bolted to the frame 2. The trigger 25 is connected by a link 27 to a latch 28 pivoted to the support 26 at point 29. The end of the latch 28 engages a coil spring 30 held betwen it and the support 26. A stop 31 is provided to limit movement of the latch 28 induced by the spring 30. A latch engaging member 32 is mounted on the rod 13 and is held beneath the latch 28 as shown in dotted line in Figure 2 when a closure is not positioned in the star-wheel 4 and the trigger 25 is thus moved to the left in Figure 2 by spring 30. Upward movement of the rod 13 and the pad-holding member 11 is arrested by such engagement and the thrust of spring 20 is taken by latch 28.

As shown more clearly in Figure 2, movement of the trigger 25 toward the right, as upon engagement with a closure, pivots the latch 28 about point 29 and compresses the spring 30 between the end of the latch 28 and the support 26. When there is no closure in the station, the spring 30 expands moving the latch 28 in the opposite or left-hand direction, where it will engage the member 32 and limit any movement of the pad-holding member 11 until a closure comes into the application station and engages the trigger 25, releasing the latch and permitting movement of the rod 13.

In operation, the lever 25 is positioned over the space on the plate 7, later occupied by the closure 5. As the star-wheel 4 brings the closure 5 into predetermined position over the pad 17, the closure 5 engages the trigger 25 and moves it a slight distance toward the latch 28, thus pivoting the latch 28 about the point 29 and compressing the spring 30. Upon removal of the closure 5, the lever 25 is returned to its normal position by expansion of the spring 30. If inadvertently, a closure is not placed within the star-wheel, the lever 25 remains in its normal position; thus retaining the latch 28 in position to engage the member 32 on the rod 13 to prevent substantial upward movement; as the cam 23 rotates, thus permitting the spring 20 to raise the rod 13, the block 32 on the rod 13 after slight movement will engage and be held under the latch 28 thus limiting any further upward movement of the rod 13 carrying the pad-holding member 11.

While I have described and illustrated a preferred embodiment of my invention, it will be understood my invention is not limited thereto since it may be otherwise embodied within the scope of the following claims.

I claim:

1. In a device for applying a coating to the exposed face of a sealing liner while it is contained in a metallic skirted closure, the combination of means for supporting a metallic skirted closure carrying a sealing liner in predetermined position, a pad adapted to apply a coating to the sealing liner placed in alignment therewith, yielding means for moving said pad into engagement with the sealing liner to apply the coating, and means to retract said pad to original position against the resistance of said yielding means.

2. In a device for applying a coating to the exposed face of a sealing liner while it is contained in a metallic skirted closure, the combination of means for supporting a metallic skirted closure carrying a sealing liner in predetermined position, a pad supported below said closure adapted to apply a coating to the sealing liner, yielding means adapted to move said pad upwardly into engagement with the sealing liner to apply the coating, and means to retract said pad to original position against the resistance of said yielding means.

3. In a device for applying a coating to the exposed face of a sealing liner while it is contained in a metallic skirted closure, the combination of a pad adapted to apply a coating to the sealing liner while it is contained in a metallic skirted closure, yielding means for moving said pad upwardly into engagement with the sealing liner to apply the coating, and means for preventing substantial upward movement of said pad upon the omission of a closure from the device.

4. In a device for applying a coating to the exposed face of a sealing liner while it is contained in a metallic skirted closure, the combination of means for supporting a metallic skirted closure carrying a sealing liner in predetermined position, a pad supported below said closure adapted to apply a coating to the sealing liner, a pad-holding member mounted on a vertically extending rod, means for holding said rod in vertical position without substantial rotary movement, yielding means surrounding said rod adapted to move said pad upwardly into engagement with the sealing liner to apply the coating, and means to retract said pad to original position against the resistance of said yielding means.

5. In a device for applying a coating to the exposed face of a sealing liner while it is contained in a metallic skirted closure, the combination of means for supporting a metallic skirted closure carrying a sealing liner in predetermined position, a pad supported below said closure in

alignment with the liner adapted to apply a coating thereto, a pad support mounted on a vertically extending rod, a helical spring surrounding said rod, said spring being adapted to move the pad upwardly into engagement with said liner to apply a coating thereto, and a cam connected to said rod carrying the pad support adapted to positively retract said pad to original position.

6. In a device for applying a coating to the exposed face of a sealing liner while it is contained in a metallic skirted closure, the combination of means for supporting a metallic skirted closure carrying a sealing liner in predetermined position, a pad supported below said closure in alignment with the liner adapted to apply a coating to the sealing liner, a pad support mounted on a vertically extending rod, a helical spring surrounding said rod, said spring being adapted to move the pad upwardly into engagement with said liner to apply a coating thereto, a cam follower mounted on said rod, and a cam engaging said follower adapted to positively retract the pad to original position against the resistance of said spring after the pad has applied a coating to the sealing liner.

7. A device according to claim 6, in which mechanical means are provided for preventing substantial upward movement of the pad upon the omission of a closure from the device.

8. In a device for applying a liquid coating to the exposed surface of a sealing liner assembled with a closure element, a support for positioning a closure element with its sealing liner disposed in substantially horizontal plane above a liquid bath, an applicator for transferring liquid from the bath to the liner upon contact therewith, yielding means for moving the applicator through the bath and into contact with the exposed surface of the liner, and means for preventing substantial movement of the applicator upon the omission of a closure from the device, and means to retract the applicator to original position against the resistance of said yielding means.

9. A device for applying a liquid coating to the exposed surface of a sealing liner assembled with a closure element comprising a support for a closure element, a tank disposed below said support adapted to receive a liquid bath, a star-wheel for positioning a closure to be treated on said support with the exposed surface of the sealing liner facing said tank, an applicator normally disposed below the surface of the liquid in said tank, and means for moving said applicator through said bath into engagement with the exposed surface of said liner and for returning said applicator to its normal position below the level of the liquid in the tank, said applicator moving means being synchronized with movement of said star-wheel.

10. In a device for applying a coating to the exposed face of a sealing liner while it is contained in a metallic skirted closure, the combination of an applicator adapted to apply a coating to the exposed face of the sealing liner while it is contained in a metallic skirted closure, yielding means for moving said applicator into engagement with the liner to apply the coating, means for preventing substantial movement of the applicator upon the omission of a closure from the device, and means to retract said applicator to original position against the resistance of said sealing means.

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