Feb. 9, 1960

E. H. JOHNSON

2,924,376

MAIL BOX SIGNAL

Filed July 9, 1958

2 Sheets-Sheet 1

FIG. 1

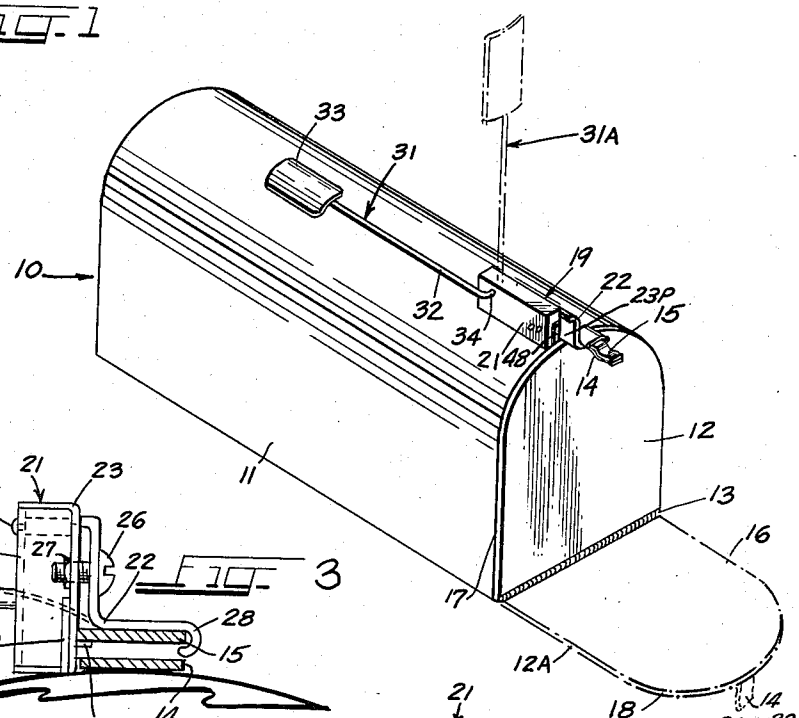
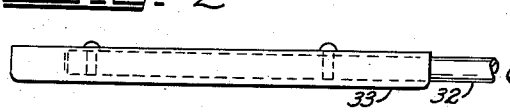


FIG. 3

FIG. 2



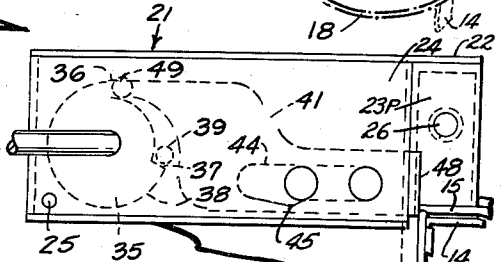
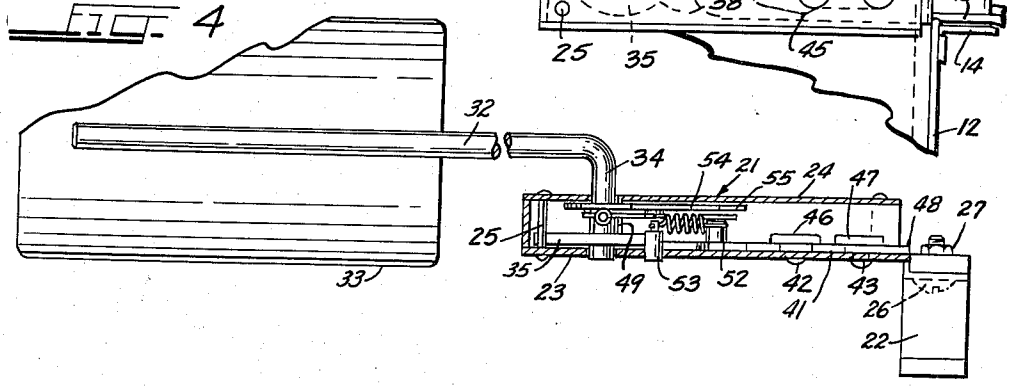


FIG. 4



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FIG. 5

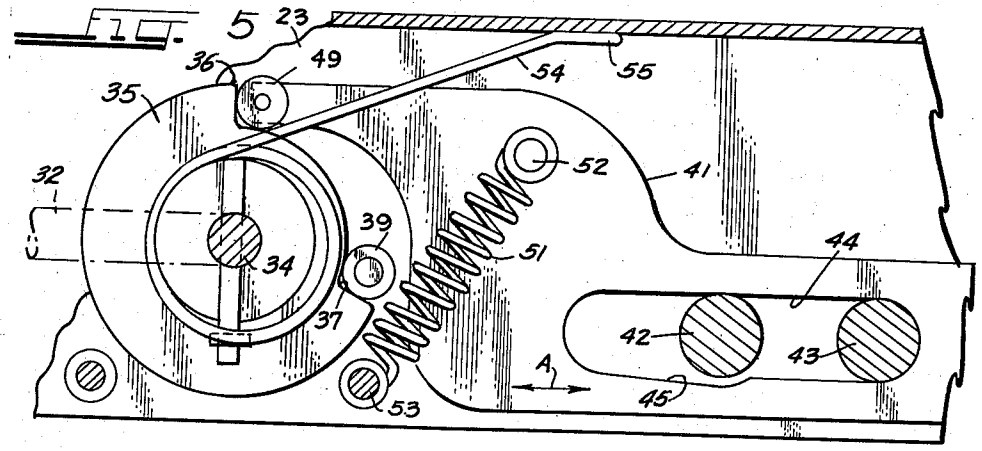


FIG. 7

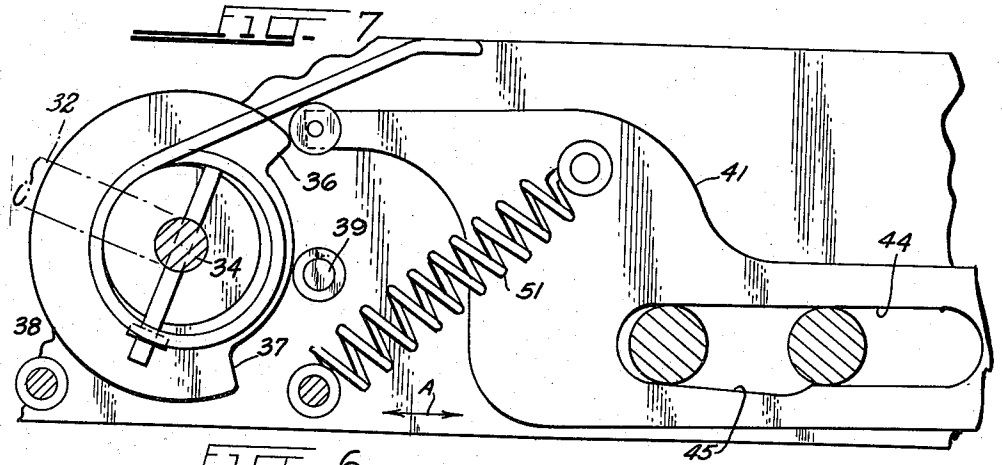
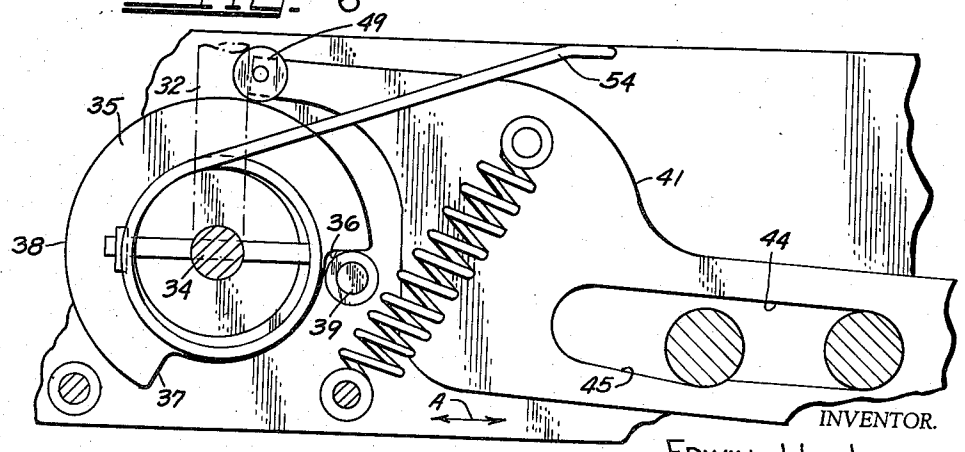


FIG. 6



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MAIL BOX SIGNAL

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4 Claims. (Cl. 232—35)

This invention relates to a new and improved signal device for use on a mail box and more specifically to a new and improved signal device which may be mounted upon and used in conjunction with a conventional rural mail box without requiring substantial modification of the mail box.

Many rural mail boxes are equipped with signal flags or similar devices which may be actuated by the mail carrier to inform the owner of the box whenever mail has been deposited therein. These same signal members may also be employed to inform the carrier that the mail box owner has deposited mail in the box to be picked up. In general, these devices are not automatic in nature and it is necessary that the carrier or owner of the box remember to move the signal flag from a normal position to a signalling position each time mail is deposited in the box, whether for pickup or delivery purposes.

Other mechanisms have been proposed for automatically actuating the signal each time the door of the box is opened to deposit mail therein. These devices have been relatively complex in construction, however, and in general have required substantial modification in the construction of the mail box itself. Consequently, the automatic signal devices have not enjoyed widespread acceptance and use.

A principal object of the invention, therefore, is a new and improved automatic mail box signal which is relatively simple and economical in construction and which includes a minimum number of parts.

Another object of the invention is a new and improved automatic mail box signal which may be conveniently mounted upon a conventional mail box and which may be actuated automatically by opening of the mail box door or cover, yet which does not require any structural modification of the box.

A more specific object of the invention is a new and improved mail box signal which is controlled completely by a single cam and a single actuating member which cooperates with that cam, thereby minimizing maintenance and operational difficulties and hold the cost of the device to a minimum.

Other and further objects of the present invention will be apparent from the following description and claims and are illustrated in the accompanying drawings which, by way of illustration, show a preferred embodiment of the present invention and the principles thereof and what is now considered to be the best mode for applying those principles. Other embodiments of the invention embodying the same or equivalent principles may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claims.

In the drawings:

Fig. 1 is a perspective view of a conventional rural mail box having a mail box signal construction in accordance with the invention mounted thereon; Fig. 2 is a fragmentary elevation view of a mail box signal constructed in accordance with a preferred embodiment of the invention; Fig. 3 is a front elevation view of the mail box signal; Fig. 4 is a bottom view of the mail box signal with a part of the housing removed to show the operating mechanism therein; Fig. 5 is an elevation view, drawn to an enlarged scale, showing the signal operating mechanism in a first or initial position; Fig. 6 is an elevation view of the signal operating mechanism, similar to Fig. 5 but showing the mechanism in a signalling or released position; and Fig. 7 is a view of the signal operating mechanism similar to Figs. 5 and 6, showing the mechanism in an intermediate or transient position.

In Fig. 1 there is illustrated a conventional rural mail box 10 having a main or body section 11 with one open end covered by a door or cover 12. The door 12 is hinged to the body 11 of the mail box as indicated by reference numeral 13, and may be swung from a closed position covering the open end of the mail box to an open position indicated by the phantom outline 12A. To hold the door 12 in closed position, the mail box 10 is provided with a simple latch comprising a pair of spring latch members 14 and 15. The latch member 14 is mounted upon the cover 12, whereas the mating latch member is affixed to and projects from the body 11 of the mail box.

In accordance with conventional practice, the rim of the door 12 is provided with a flange 16 which fits into the open end 17 of the box. Furthermore, the edge portion of the door affords a bead 18 which engages the rim of the open end 17 of the box. It is not essential that the present invention be employed with a box having this particular door construction, however; indeed, the invention is applicable to any ordinary swinging door structure.

A mail box signal device 19 is mounted upon the body 11 of the mail box 10 adjacent the open end 17 thereof. The general construction and organization of the signal device 19 may best be understood by reference to Figures 1–4, which show the signal in its operative relation to the mail box. As indicated in these figures, the mail box signal 19 comprises a housing or support structure 21 which is disposed closely adjacent the open end 17 of the mail box and is mounted on the box by means of a bracket 22. The support structure 21 is relatively simple in construction and comprises a pair of sheet metal support members 23 and 24 which fit together to form an enclosed housing, the two members 23 and 24 being secured to each other by suitable means such as the screws, rivets, or other fastening devices 25.

The bracket 22 is affixed to the housing 21 by means of a bolt 26, which is threaded into a nut 27 secured to a projecting tab portion 23P of the housing or support member 23. The bracket includes a hook shaped projection 28, which engages one side of the upper or fixed latch member 15 as best shown in Figure 3. A small ear or lug 29 projects outwardly of the housing member 23 and engages the opposite side of the latch member 15. The lug 29 is preferably formed as an integral part of the housing member 23. Thus, the housing 21 may be mounted upon the latch member 15 simply by loosening the bolt 26, sliding the housing structure onto the latch member 15 with the lug 29 beneath the latch member, and tightening the bolt 26 to bring the projection portion 28 of the bracket 22 into gripping engagement with the latch member 15.

The mail box signal 19 also includes a signal member 31 comprising an elongated rod 32 having a flag or signal element 33 mounted on one end thereof. The end of the rod 32 opposite the flag 33 is bent to form a right angle portion 34 which extends through and is journaled in the two support members 23 and 24 comprising

the support structure 21. The signal member 31 is movable between an initial or unactuated position, as indicated in solid lines in Fig. 1, and an actuated or signalling position, as illustrated by the phantom outline 31A.

A cam member 35 is mounted upon the extension or shaft portoin 34 of the signal member 31, the cam being located within the housing afforded by the support structure 21. The cam member 35 is relatively simple in construction; it is a single-lobe cam affording a pair of arcuately displaced shoulders 36 and 37 separated by a cam surface 38. Within the housing 21, there is a fixed stop member 39 which is positioned within the path of movement of the two cam shoulders 36 and 37. The stop member 39 is employed to limit rotational movement of the cam to a predetermined arc, as discussed more fully hereinafter.

The operating mechanism of the signal device 19 also includes a latch pawl 41 which is mounted within the housing 21 upon a pair of studs 42 and 43, the studs being secured to the support 23. The studs 42 and 43 project through an elongated slot 44 in the pawl 41. The studs 42 and 43 are provided with individual washers or collars 46 and 47, respectively, which engage the pawl and maintain it in alignment with the vertical side position of the support member 23. An intermediate portion 45 of the slot 44 is enlarged to permit pivotal movement of the pawl 41 about the stud 42. Thus, the pawl is movable in two co-ordinate directions; it may be moved linearly lengthwise of the slot 44, and it may move pivotally. One end 48 of the pawl 41 projects outwardly of the housing 21 and is engaged by the bead or flange portion 18 of the mail box cover 12. The opposite end of the pawl carries a cam follower roller 49 which engages the cam 35.

The operating mechanism of the signal device 19 is also provided with a biasing means for urging the pawl 41 into engagement with the cam 35. This biasing means comprises a tension spring 51 having one end connected to a pin 52 on the pawl 41. The opposite end of the spring 51 is connected to a pin 53 mounted upon and extending between the support members 22 and 23. In addition, the operating mechanism includes a signal actuating means which provides the driving force necessary for automatic actuation of the signal device. In the illustrated embodiment, this actuating means comprises a torsion spring 54 shown in Figs. 5–7. One end 55 of the spring 54 is affixed to the upper wall portion of the support member 23. The opposite end of the spring is wound around and affixed to the hub of the cam 35, as best illustrated in Figs. 5–7.

Referring to Fig. 4 it is seen that the pawl 41 is positioned closely adjacent the interior surface of the support member 23. Cam 35 is positioned adjacent the same interior surface of the housing. The cam follower 49, a portion of which is obstructed by shaft 34 as viewed in Fig. 4, engages the periphery of the cam 35. The spring 54 is positioned adjacent the interior surface of the housing member 24 and is attached to the interior of the upper surface of the housing 21 at the portion 55. The spring 54 is connected to the signal element shaft 34 to cause rotation of the signalling element to a signalling position. As is apparent in Fig. 4, the spring 54 and pawl 41 are disposed adjacent opposite sides of the housing 21.

In explaining the operating characteristics of the mail box signal 19, it should be understood that Fig. 5 shows the signal mechanism in a first or non-signalling position, that Fig. 6 shows the mechanism in an actuated or signalling position, and that Fig. 7 illustrates a transitional position which occurs as the mechanism moves between the positions of Figs. 5 and 6. With these considerations in mind, the description of operation may be initiated by first considering Fig. 5.

With the mechanism in the position illustrated in Fig. 5, the signal arm 32 is disposed substantially horizontally, with the flag 33 downward in its non-signalling position. The actuating spring 54 exerts a continuing force upon the hub position of the cam 35 urging the cam toward rotation in a clockwise direction. Because the cam is pinned or otherwise affixed to the shaft portion 34 of the arm 32, the spring also biases the arm 32 toward clockwise rotation.

The shoulder 36 of the cam 35, however, is engaged by the cam follower roller 49 on the pawl 41. The pawl 41 cannot move in a horizontal direction, since, with the cover of the mail box closed, the end 48 of the pawl is engaged by the edge portion 18 of the mail box cover 12 (see Fig. 2). Moreover, the pawl 41 is restrained against vertical or pivotal movement by the spring 51. Consequently, the cam follower portion 49 of the pawl 41 prevents movement of the cam 35 and the signal member arm 32 from the position shown in Fig. 5 as long as the cover of the mail box remains closed.

When the cover 12 of the mail box 10 is opened, however, as when the cover is moved to the position 12A (Fig. 1) to place mail in the box, the operating mechanism of the signal device 19 is automatically actuated to raise the signal member 31 to its alternate or signalling position 31A. When the cover of the box is opened, the pawl 41 is released for movement in the first coordinate direction as indicated in Figs. 5–7 by the arrow A. Upon release, the spring 54 drives the cam 35 in a clockwise direction, forcing the cam follower 49 and the pawl 41 to the right as seen in these figures. After the cam has rotated through a relatively short arc, it reaches a transient position in which the cam follower 49 is effectively displaced, horizontally, from the path of movement of the cam shoulder 36, this position being shown in Fig. 7. Continued rotation of the cam brings the cam to a released or signalling position as shown in Fig. 6. In the position of Fig. 6, the rotational movement of the cam 35 is interrupted by engagement of the cam shoulder 36 with the stop member 39. Stop member 39 thus effectively holds the cam 35 and the signal arm 32 in the desired signalling position with the signal arm projecting vertically upwardly and with the flag 33 elevated for ready visibility. (See Fig. 1).

The cam follower 49 is of course engaged with the cam surface 38 of the single lobe on the cam 35 and may ride along the cam surface to the position illustrated in Fig. 6. In any event, as soon as the cover of the mail box is closed, the pawl 41 is again forced inwardly of the housing 21 and ends up in the position shown in Fig. 6, with the cam follower 49 riding upon the surface 38 of the cam. Thus, the cam follower is displaced in its second co-ordinate direction, being pivoted about the stud 42, in reaching the position of Fig. 6. It should be noted, however, that closing of the cover does not move the cam 35 or the signal arm 32 from their signalling positions. This is true because the cam follower has been displaced from any possible engagement with cam shoulder 36 and cannot move the cam back to its original position.

When the mail is picked up, of course, it is desirable again to restore the device 19 to its initial or unactuated position in order that the box owner will know when the next delivery of mail is made. To restore the signal device to its original condition, it is only necessary to move the arm 32, manually, in a counter clockwise direction back to the position shown in Fig. 5. With the cover of the box closed, as it would be after removal of the mail, counter clockwise rotation of the arm 32 causes a similar rotation of the cam 35, restoring the cam to the position shown in Fig. 5. The return movement of the cam is limited by engagement of the stop 39 with the cam shoulder 37. As soon as the cam reaches this position, the spring 51 pulls the pawl 41 downwardly and brings the cam follower 49 again into the path of movement of the cam shoulder

36. Consequently, the cam follower 49 is again in position to prevent rotational movement of the cam 35 and thus holds the signal mechanism in its original or unactuated position.

The extreme simplicity of the mail box signal 19 affords a two-fold advantage. Of primary importance is the fact that there are no complex and expensive parts in the entire mechanism. That is, there are no gears or other complex drive connections. Moreover, the single lobe cam 35 is extremely simple and inexpensive and does not include any parts of unusual or complex configuration. Indeed, except for a relatively simple housing, the device 19 may be considered as including only six essential parts, these being the arm 32, the cam 35, the stop 39, the pawl 41, and the springs 51 and 54.

Another important advantage of the described construction relates to the possibility of malfunction when in use. Because of its simplicity and inherent sturdiness of construction, the operating mechanism of the mail signal 19 is almost completely trouble-free in operation. The entire mechanism is completely enclosed except for the projecting end of the pawl 41, thus affording adequate protection against corrosion and other similar difficulties. There is little likelihood that any portion of the mechanism could be misaligned with respect to the other portions, regardless of the number of times and the manner in which the signal is actuated.

Another highly important advantage of the mail box signal 19 relates to the mounting of the signal mechanism upon the mail box 10. As pointed out hereinbefore, it is completely unnecessary to modify the mail box or the existing latch member 15 on the mail box. No holes are drilled in the box and no other structural changes are required. The signal may be readily adapted to use with any conventional box, regardless of minor structural variations.

Hence, while the preferred embodiment of the invention has been illustrated and described, it is to be understood that this is capable of variation and modification, and I therefore do not wish to be limited to the precise details set forth, but desire to avail myself of such changes and alterations as fall within the purview of the following claims.

I claim:

1. A mail box signal for attachment to a mail box having an openable cover, said attachment comprising: a support structure; means for mounting said support structure on a mail box; a signal member pivotally mounted on said support structure; a single-lobe cam, connected to said signal member for rotation therewith, said cam lobe affording a pair of shoulders and a cam surface; a stop member for engaging said cam shoulders to limit pivotal movement of said member to an arc terminating at opposite ends in an initial position and a signalling position; a latch pawl having a cam follower mounted on one end thereof and a cover-engaging portion at the opposite end thereof; means for mounting said pawl on said support structure for movement in two co-ordinate directions from a latching position in which said cam follower engages one of said cam shoulders to maintain said cam member in said initial position, through a transient position in which said cam follower is displaced from the path of movement of said one cam shoulder in a first co-ordinate direction, to a released position in which said cam follower engages said cam surface and is displaced from the path of movement of said one cam shoulder in a second co-ordinate direction, movement of said pawl in said first co-ordinate direction being prevented by engagement with the mail box cover when the cover is closed; a first spring, connected to said pawl and said support structure, for urging said pawl in said second co-ordinate direction away from said transient position and toward said latching position; and a second spring, connected to said cam member and said support structure, for driving said cam member from said initial position to said signalling position, thereby driving said pawl to said transient position, whenever the mail box cover is opened and released from engagement with said pawl.

2. A mail box signal for attachment to a mail box having an openable cover, said attachment comprising: a support structure, means for mounting said support structure on a mail box, a signal member pivotally mounted on said support structure, a rotatable cam member having a low portion and at least one shoulder portion, the cam being connected to said signal member for rotation therewith, first resilient means biasing the cam and signal member toward a signalling position, a latch pawl having a cam follower and a portion for contacting said openable cover, said pawl having an elongated slotted guide shaped to permit reciprocatory and rotational movement of the pawl, a pivot pin within the guide attached to the support structure and coacting with the guide in the reciprocatory and rotational movement of the pawl, second resilient means biasing the cam follower of the pawl toward the cam to maintain continuous engagement of the cam follower on the cam, the low and shoulder portions of the cam being so located with respect to the signal member that with the signal member in a non-signalling position and the mail box cover in closed, abutting relation with the contacting portion of the latch pawl, the cam follower resides on the low portion of the cam and abuts the shoulder portion of the cam to maintain the signal member in a non-signalling position.

3. A mail box signal for attachment to a mail box having an openable cover, said attachment comprising: a support structure, means for mounting said support structure on a mail box, a signal member pivotally mounted on said support structure, a rotatable cam member having a low portion and at least one shoulder portion, the cam being connected to said signal member for rotation therewith, a stop fixed to said support structure and positioned to abut the shoulder portion of the cam to limit the rotational movement of the cam upon attainment of the signalling position of the signal member, first resilient means biasing the cam and signal member toward a signalling position, a latch pawl having a cam follower and a portion for contacting said openable cover, said pawl having an elongated slotted guide shaped to permit reciprocatory and rotational movement of the pawl, a pivot pin within the guide attached to the support structure and coacting with the guide in the reciprocatory and rotational movement of the pawl, second resilient means biasing the cam follower of the pawl toward the cam to maintain continuous engagement of the cam follower on the cam, the low and shoulder portions of the cam being so located with respect to the signal member that with the signal member in a non-signalling position and the mail box cover in closed, abutting relation with the contacting portion of the latch pawl, the cam follower resides on the low portion of the cam and abuts the shoulder portion of the cam to maintain the signal member in a non-signalling position.

4. A mail box signal for attachment to a mail box having an openable cover, said attachment comprising: a support structure, means for mounting said support structure on a mail box, a signal member pivotally mounted on said support structure, a rotatable cam member having a low portion, a high portion, and at least one shoulder portion, the cam being connected to said signal member for rotation therewith, a stop fixed to said support structure and positioned to abut the shoulder portion of the cam to limit the rotational movement of the cam upon attainment of the signalling position of the signal member, first resilient means biasing the cam and signal member toward a signalling position, a latch pawl having a cam follower and a portion for contacting said opening cover, said pawl having an elongated slotted

guide shaped to permit reciprocatory and rotational movement of the pawl, a pivot pin within the guide attached to the support structure and coacting with a guide in the reciprocatory and rotational movement of the pawl, second resilient means biasing the cam follower of the pawl toward the cam to maintain continuous engagement of the cam follower on the cam, the lower and shoulder portions of the cam being so located with respect to the signal member that with the signal member in a non-signalling position and the mail box cover in closed, abutting relation with the contacting portion of the latch pawl, the cam follower resides on the low portion of the cam and abuts the shoulder portion of the cam to maintain the signal member in a non-signalling position, and the signalling element, cam, pawl and resilient means

being arranged so that upon opening of the mail box cover the first resilient means is operative to move the latch pawl in reciprocatory movement against the bias of the second resilient means through the cam follower and cam shoulder and the high portion of the cam is operative to move the latch pawl in reciprocatory and rotational movement as the cam follower follows the high portion of the cam upon closure of the mail box cover with the signal member in a signalling position.

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