March 4, 1958 F. C. OSTEN 2,825,090

SASH BALANCE COUPLING DEVICE

Filed March 21, 1955 2 Sheets-Sheet 1

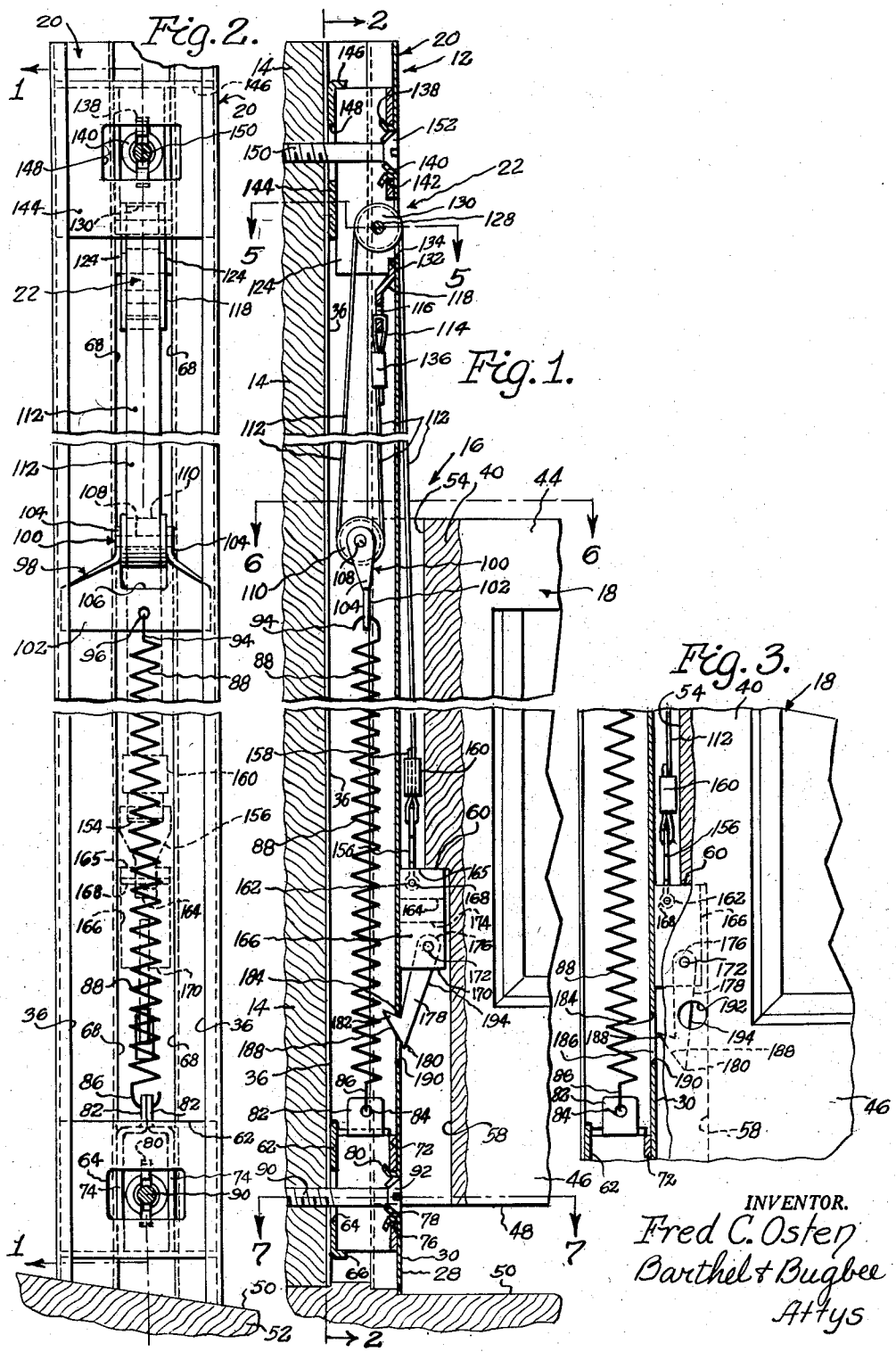


Fig. 2.

Fig. 1.

Fig. 3.

INVENTOR.
Fred C. Osten
Barthel & Bugbee
Attys

March 4, 1958 F. C. OSTEN 2,825,090

SASH BALANCE COUPLING DEVICE

Filed March 21, 1955 2 Sheets-Sheet 2

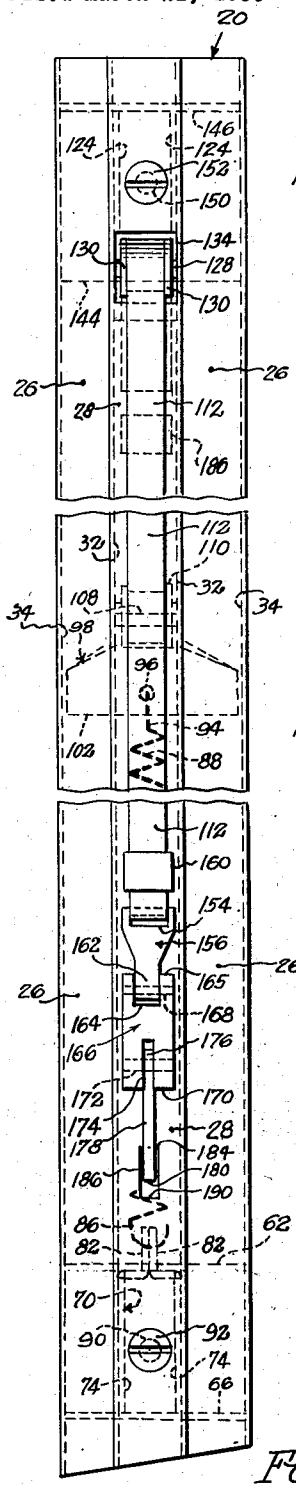


Fig. 4.

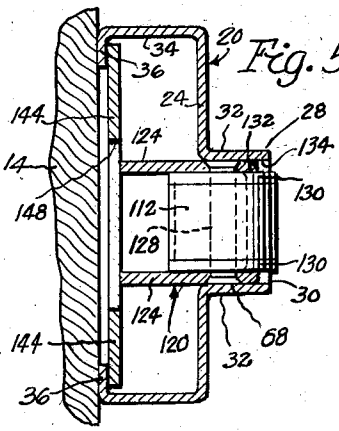


Fig. 5.

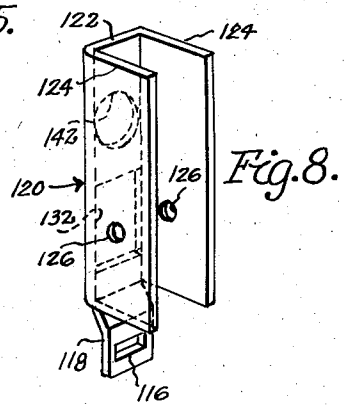


Fig. 8.

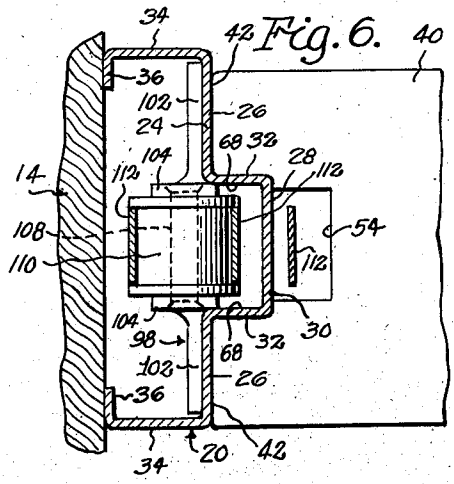


Fig. 6.

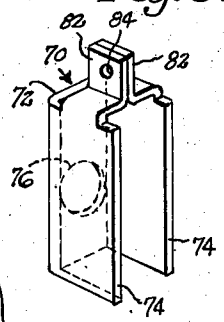


Fig. 9.

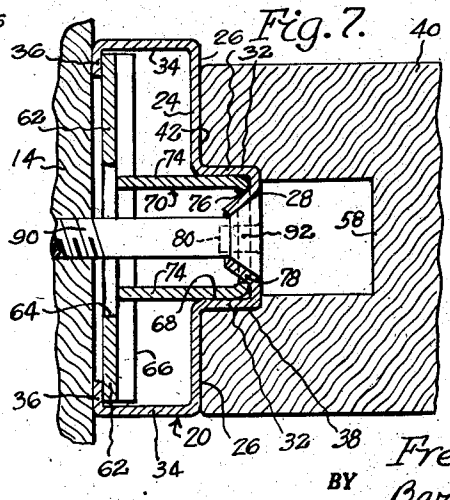


Fig. 7.

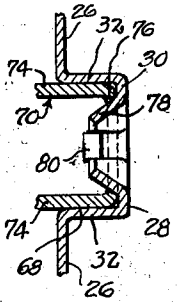


Fig. 10.

INVENTOR.
Frea C. Osten
BY Barthel & Bugbee
Attys

United States Patent Office

2,825,090

Patented Mar. 4, 1958

2,825,090

SASH BALANCE COUPLING DEVICE

Fred C. Osten, Detroit, Mich.

Application March 21, 1955, Serial No. 495,403

3 Claims. (Cl. 16—202)

This invention relates to sash balances and, in particular, to sash balances to the sash of a removable sash window.

One object of this invention is to provide a coupling device for detachably connecting a sash balance for removable sash windows wherein the flexible attachment member by which the tension of the balancing spring is transmitted to the sash is detachably connected to the sash and is temporarily attachable to a stationary keeper while the balancing spring is under tension, this being done by a simple manipulation, so that the sash may be removed from the window frame, cleaned or repaired, and reinserted without releasing the tension of the balancing spring until the sash is completely back in the window frame in the position it occupied before it was removed.

Another object is to provide a coupling device of the foregoing character for removable sash windows, wherein the temporary anchoring device permitting removal of the sash without releasing the tension of the balancing spring includes a contact member engageable with the sash for transmitting the balancing force from the elongated flexible force-transmitting member to the sash, and a latch which is adapted to be moved into and out of locking engagement with the stationary keeper.

Another object is to provide a coupling device of the foregoing character for removable sash windows, wherein the latch consists of a hook which is swingable into and out of locking engagement with the stationary keeper, the hook being preferably releasable automatically to reapply the balancing force of the balancing spring upon reinsertion of the sash and re-engagement of the sash with the contact member.

Another object is to provide a combined sash guide and sash balance support of the foregoing character for removable sash windows wherein the balancing spring and force-transmitting mechanism are housed in an elongated sash guide, preferably of metal, which in addition to its sash guiding function also serves as a frame or "backbone" for the sash balancing mechanism, the stationary keeper being preferably on the sash guide.

Other objects and advantages of the invention will become apparent during the course of the following description of the accompanying drawings, wherein:

Figure 1 is a vertical section through a combined sash guide and sash balance according to one form of the invention, as installed in a double-hung sliding-sash window, taken approximately along the line 1—1 in Figure 2, with the balancing spring, pulleys and sash contact member thereof in side elevation, and with the sash balance temporarily latched for sash removal;

Figure 2 is a vertical section at right angles to Figure 1, with most of the parts in rear elevation, taken approximately along the line 2—2 in Figure 1;

Figure 3 is a fragmentary vertical section similar to the lower portion of Figure 1, but with the sash mainly

in side elevation and with the latching hook swung into its released or unlatched position;

Figure 4 is a front elevation of the combined sash guide and sash balance of Figures 1 to 3 inclusive, looking from the right toward the left in Figure 1, with the sash removed and the sash balance latched in its tensioned position;

Figure 5 is an enlarged horizontal section taken along the line 5—5 in Figure 1, showing the upper or stationary pulley of the sash balance;

Figure 6 is an enlarged horizontal section taken along the line 6—6 in Figure 1, showing the lower or travelling pulley of the sash balance;

Figure 7 is an enlarged horizontal section taken along the line 7—7 in Figure 1, showing the means by which the combined sash guide and sash balance is secured to the window frame;

Figure 8 is a perspective view of the upper pulley mount and force-transmitting tape anchorage, removed from the sash guide;

Figure 9 is a perspective view of the balancing spring anchorage, removed from the sash guide; and

Figure 10 is a fragmentary horizontal section similar to the central portion of Figure 7, but with the mounting screw removed to show the means of connecting the balancing spring mount to the sash guide.

Referring to the drawings in detail, Figures 1 and 2 show a combined sash guide and sash balance, generally designated 12, according to one form of the invention, as mounted in the window frame 14 of a double-hung sliding sash window, generally designated 16, having a sash 18 removably mounted therein. The window frame 14 and sash 18 are conventional, except as to the means of engaging the sash balance contact member with the sash 18. Only the lower sash 18 is shown in the drawings, the upper sash being omitted to simplify the disclosure.

The combined sash guide and sash balance 12 includes a channel-shaped sash guide, generally designated 20, shown for convenience as made of rolled sheet metal, and serving as a mounting structure for the sash balancing mechanism, generally designated 22. The sash guide 20 has a front wall 24 divided into two lateral portions 30 and a central hollow rib 28 including a forwardly-displaced central wall 30 and side walls 32 connecting the lateral front wall portions 26 to the central wall 30. Perpendicular to the lateral front wall portions 24 and continuing rearwardly therefrom are elongated side walls 34 terminating in inwardly-directed flanges 36 parallel to the lateral front wall portions 26 and the central front wall portion 30. The hollow rib 28 engages a corresponding guide groove 38 in the sash stiles or vertical side members 40 which have edges 42 slidably engaging the lateral front wall portions 26 of the sash guide 20 (Figures 6 and 7). The removable sash 18 is equipped with the usual meeting rail 44 and bottom rail 46, the latter having a lower edge 48 engageable with the downwardly and outwardly-sloping upper surface 50 of the window sill 52. The stiles 40, only one of which is shown, are equipped with a shallow upper extension groove 54 (Figure 6) and a lower deep extension groove 58 (Figure 7), both extending inwardly beyond the sash guide groove 38 and separated from one another by a horizontal abutment shoulder 60 detachably engaged by the sash balance mechanism 22, as described below.

Mounted within the sash guide 20 and extending thereacross near the lower end thereof in engagement with the flanges 36 is a lower back plate 62 having an aperture 64 therein, shown as rectangular in Figure 2, but obviously of any desired suitable shape, the lower edge thereof having a flange 66 thereon bent at right angles

thereto (Figures 1 and 7). Mounted in the space between the lower back plate 62 and the central front wall portion 30 of the sash guide 20 and snugly engaging the recess 68 inside the hollow rib 28 is a lower or balancing spring anchorage, generally designated 70 (Figures 1, 2, 7 and 9). The latter consists of a channel-shaped member having a front web or wall 72 in the connecting parallel side walls 74 which in turn snugly engage the rib side walls 32 within the groove 68. The web 72 is provided with a fastener hole 76 into which a conical fastener head seat portion 78 extends (Figures 7 and 10) and is held in position by tabs 80 struck out of the conical seat portion 78 and hooked around the upper and lower edges of the hole 76 (Figure 1).

Integral with the side walls 74 of the balancing spring anchorage 70 are L-shaped lugs 82 (Figure 9) which are bent toward one another into meeting engagement and provided with aligned holes 84 for the reception of the hook portion 86 on the lower end of a sash balancing spring 88. The lower end of the combined sash guide and sash balance 12 is secured to the window frame 14 by a fastener 90, such as a screw, the head 92 of which fits into and is countersunk within the fastener head seat portion 78.

The upper end of the balancing spring 88 is also provided with a hook portion 94 which is hooked into a hole 96 in the carrier 98 of the travelling block, generally designated 100, of the sash balancing mechanism 22. The carrier 98 consists of a flat plate portion 102 containing the hole 96, and spaced parallel ears 104 bent upward and inward therefrom leaving a central notch or slot 106. The ears 104 are drilled with aligned holes to receive an axle 108 (Figure 1) upon which a pulley 110 is rotatably mounted. Trained around the pulley 110 is an elongated flexible force-transmitting member 112 in the form of a tape of nylon or other suitable strong flexible material.

One end portion 114 of the flexible force-transmitting member or tape 112 is looped through a slot 116 in an inwardly offset tab 118 extending downwardly from a channel-shaped upper tape anchorage and stationary pulley mount, generally designated 120 (Figure 8), at the lower end of the central web or wall 122 thereof. Integral with the central web or wall 122 are spaced parallel side walls 124 which are drilled with aligned holes 126 receiving the opposite ends of an axle 128 upon which the stationary upper pulley 130 of the sash balancing mechanism 22 is rotatably mounted. The forward portion of the pulley 130 projects through aligned holes or rectangular apertures 132 and 134 respectively (Figures 1 and 5) in the central wall 122 of the stationary pulley mount 120 and the front wall portion 30 of the hollow rib 28 of the sash guide 20. The end portion 114 of the flexible force-transmitting member or tape 112 is formed with a permanent loop by means of the clinching element 136 (Figure 1).

The side walls 124 and front wall or web 122 of the upper pulley mount 120 fits snugly into the recess 68 inside the rib 28 in a manner similar to that of the balancing spring anchorage 70 and is similarly secured therein by tabs 138 struck out of the conical fastener head seat 140 and hooked around the upper and lower edges of a hole 142 in the web 122 of the pulley mount 120. The side walls 124 of the mount 120 engage an upper back plate 144 (Figures 1, 2 and 5) having an upper edge flange 146 and engaging the inturned flanges 36 of the sash guide 20. The back plate 144 is provided with an aperture 148 through which passes a fastener 150 similar to the fastener 90 and similarly having its head 152 engaging the fastener head seat 140.

The flexible force-transmitting member or tape 112 extends downwardly from its anchoring slot 116 in the offset tab or lug 118 around the traveling pulley 110, thence upwardly over and around the stationary pulley 130, thence outwardly through the aligned holes 132 and 134 and downwardly along the central wall 30 of the rib 28 (Figure 1) within the groove 38 to and through a slot 154 (Figure 4) in a pivoted attachment member 156 beyond which its lower end portion 158 is clamped in position against the standing portion of the flexible force-transmitting member 112 by a clinching element 160 similar to the clinching element 136. The pivoted attachment member 156 at its lower end is tapered toward an eye 162 which enters a notch 164 in the upper end 165 of a sash contact member or block 166 of rectangular cross-section fitting the lower groove extension 58.

The contact member 166 near its upper end 165 is drilled transversely into the notch 164 (Figure 4) to receive a pivot pin 168 which also passes loosely through the eye 164 of the attachment member 156. The contact member 166 near its lower end 170 is drilled transversely to receive a pivot pin 172 which passes across a slot 174 and through the drilled upper end 176 of a swinging latch 178. The latch 178 terminates in a hooked lower end 180 having an upper edge 182 engageable with the upper or keeper edge 184 of a keeper aperture or slot 186 in the central wall portion 30 of the rib 28 of the sash guide 20. The hooked lower end 180 is provided with an inclined lower cam edge 188 which under certain circumstances is engageable with the lower edge 190 of the slot 186, as described below, in connection with the operation of the invention. The stile or side member 40 of the sash 18 is provided with a hole 192 disposed in line with one edge 194 of the latch 178 when the upper end 165 of the contact block 166 is in engagement with the shoulder 60 between the upper and lower groove extensions 54 and 58 respectively (Figures 1 and 3). This hole 192 extends into the groove extension 58 and serves for the reception of a nail or other tool by which the latch 178 may be swung from the unlatched position of Figure 3 to the latched position of Figure 1, preparatory to removing the sash 18, as described below in connection with the operation of the invention.

In the operation of the invention, let it be assumed that the sash 18 is in its lowered position a slight distance above the sill 52 (Figure 3) and that it is desired to lock the sash balancing mechanism 22 in its tensioned condition and remove the sash 18. To do this, the operator pushes the sash 18 downward until the hooked end 180 arrives opposite the keeper aperture or slot 186, whereupon he then inserts a nail or other suitable tool through the hole 192 and pushes against the edge 194 of the latch 178 to swing the latter to the left, inserting the hook portion 180 thereof in the slot 186. While holding the latch 178 in this position, he pushes the sash 18 upward so that the upper edge 182 of the latch hook portion 180 engages the upper or keeper edge 184 of the slot 186, continued upward motion of the sash 18 causing the shoulder 60 thereof to move upwardly away from the upper end 165 of the contact block 166, leaving the latter firmly but temporarily locked to the sash guide 20 by the latch 178, the hook portion 180 of which is held firmly against the keeper edge 184 of the slot 186 by the tension of the balancing spring 88, transmitted to it through the flexible tension member or tape 112. The operator is then able to push the sash 18 to the right against the usual yieldingly-mounted sash guide on the opposite side thereof (not shown), freeing the sash stile groove 38 from the hollow guide rib 28 and permitting the sash 18 to be swung outward from the window frame 14.

After the sash 18 has been cleaned or repaired, as the case may be, it is replaced in the window frame by reversing the foregoing procedure, namely by pushing the right-hand side or right-hand stile 40 of the sash 18 against the yieldable sash guide (not shown) on the right-hand side, thereby permitting the stile groove 38 to be re-engaged with the guide rib 28 of the stationary sash guide 20. The sash 18 is, of course, reinserted

in such a position within the window frame **14** that the shoulder **60** between its upper and lower groove extensions **54** and **58** lies above the upper end **165** of the temporarily locked contact block **166**. The operator then pushes the sash **18** downward until the shoulder **60** engages the upper end **165** of the contact block **166** and continues to push the sash downward. Continued downward motion of the sash **18** causes the block **166** to move downward, disengaging the upper edge **182** of the hook portion **180** of the latch **178** from the keeper edge **184** of the slot **186**, whereupon gravity causes the latch **178** to swing into the vertical position shown in Figure 3.

If for any reason the latch **178** remains in its inwardly-inclined position (Figure 1) when the sash is moved downward into the position of Figure 3, the lower or cam edge **188** of the hook portion **180** of the latch **178** engages the lower edge **190** of the keeper slot **186** and by a cam action forces the lower or hooked end **180** of the latch **178** outwardly into the vertical position of Figure 3. This action releases the contact block **166** and re-applies to it the tension of the balancing spring **88** through the force-transmitting member or tape **112**, whereupon the balancing force is reapplied to the sash **18**.

Thus, by the present invention, there is provided a simple yet effective means of locking the sash balancing mechanism **22** in its tensioned condition to the sash guide **20** so that the sash **18** may be readily removed, cleaned or repaired, and replaced. Further downward motion of the sash **18** then releases and re-engages the balancing mechanism **22** with the sash **18** in the manner just described.

What I claim is:

1. A selective sash balance coupling and anchoring device for selectively coupling the flexible force-transmitting element of a sash balance to a coupling abutment in an edge recess of a removable sliding sash having an aperture communicating with said recess and temporarily

anchoring the said flexible force-transmitting element under tension during removal of the sash from its window frame, said device comprising an elongated sash guide structure adapted to be secured to the window frame in guiding engagement with the sash, a sash-coupling structure connected to the force-transmitting element and detachably engageable with said abutment, a latch keeper disposed on said sash guide structure, and a latch movably mounted on said sash-coupling structure adjacent said aperture in a position normally out of engagement with said keeper and selectively movable into engagement with said keeper by pressure exerted upon said latch through said aperture.

2. A selective sash balance coupling and anchoring device, according to claim 1, wherein said latch comprises a hook pivotally connected to and depending from said sash-coupling structure in a position normally out of engagement with said keeper and swingable into engagement with said keeper by said pressure exerted upon said latch through said aperture.

3. A selective sash balance coupling and anchoring device according to claim 2, wherein said hook has a cam portion thereon operatively engageable with a portion of said sash guide and effective to positively disengage said hook from said keeper in response to the travel of the sash and latch relatively to said sash guide in a direction away from said keeper.

References Cited in the file of this patent

UNITED STATES PATENTS

1,011,734	Brown et al.	Dec. 12, 1911
1,932,906	Muir et al.	Oct. 31, 1933
2,262,990	Cross et al.	Nov. 18, 1941
2,279,600	Tappen	Apr. 14, 1942
2,640,222	Trammell et al.	June 2, 1953
2,663,896	Trammell et al.	Dec. 29, 1953