

Nov. 22, 1966

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3,287,060

RETRACTING CHAIR

Filed Aug. 23, 1965

3 Sheets-Sheet 1

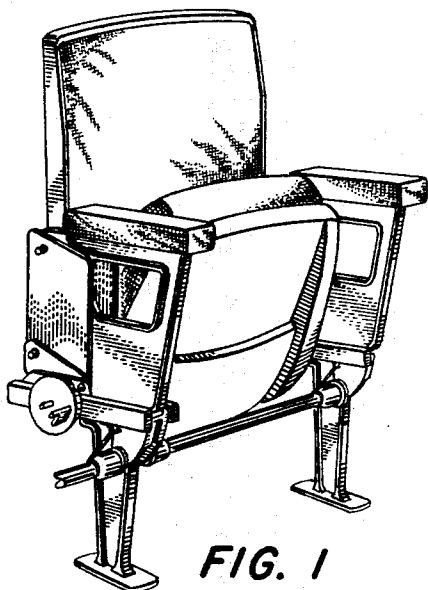


FIG. 1

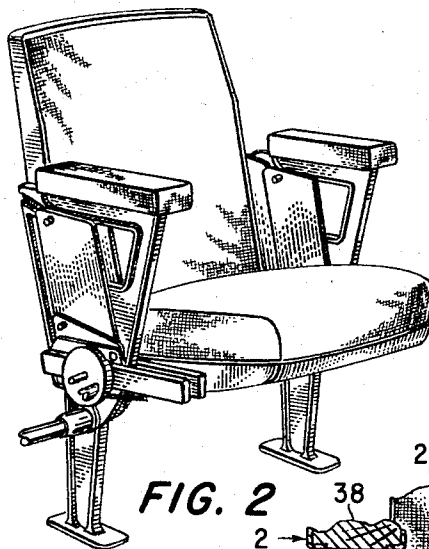


FIG. 2

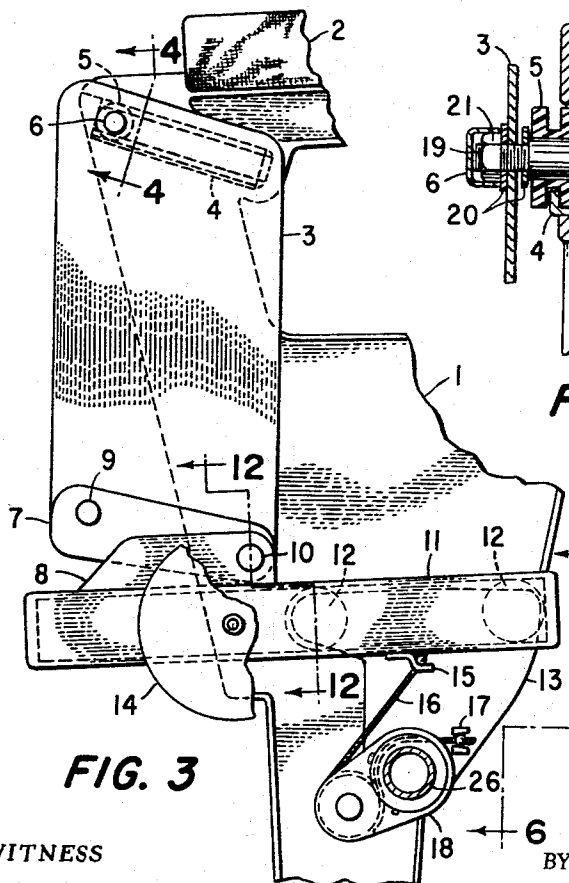


FIG. 3

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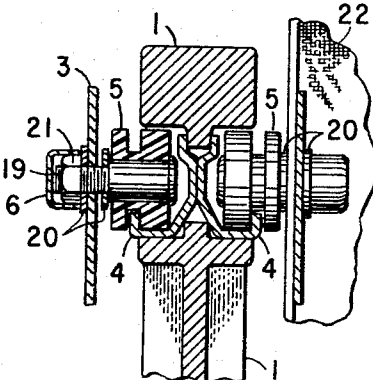


FIG. 4

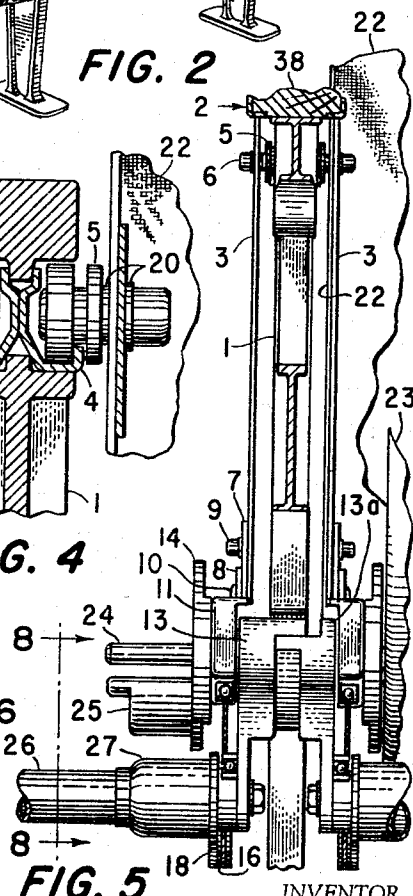


FIG. 5

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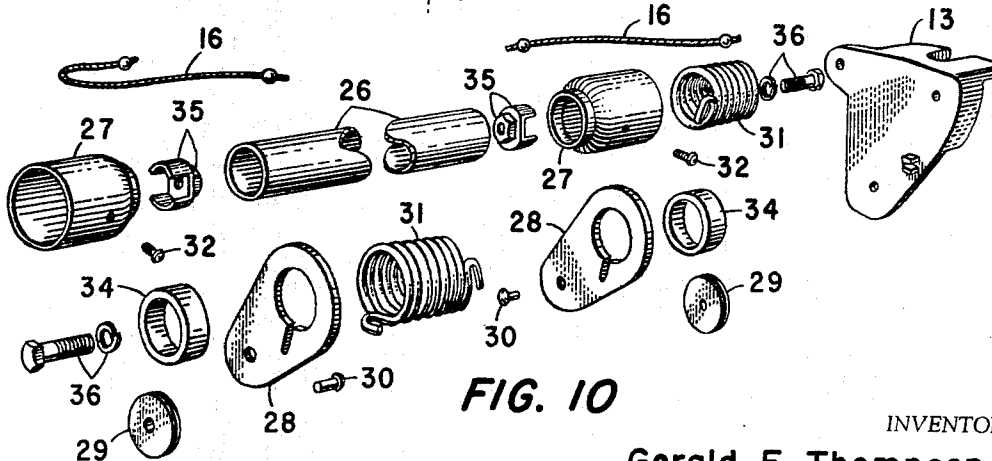
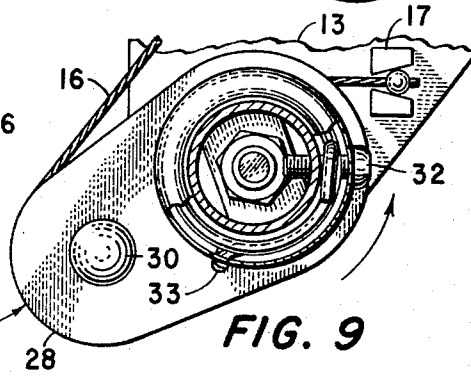
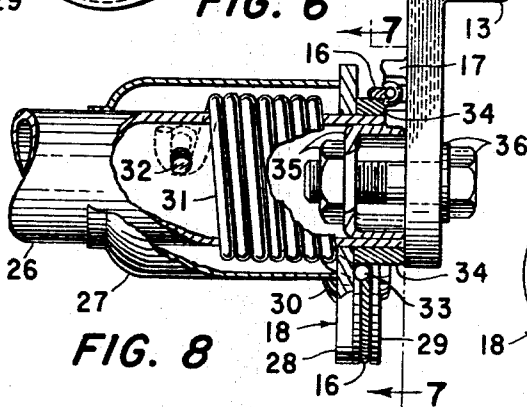
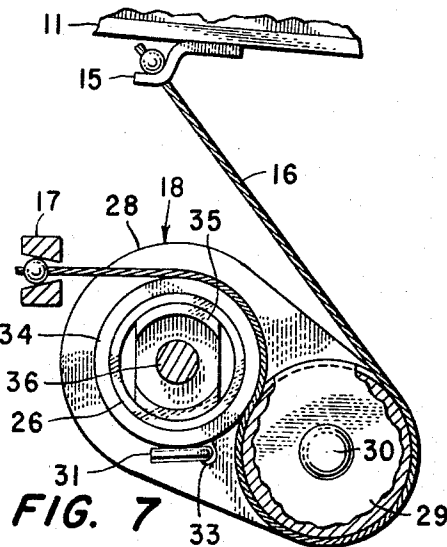
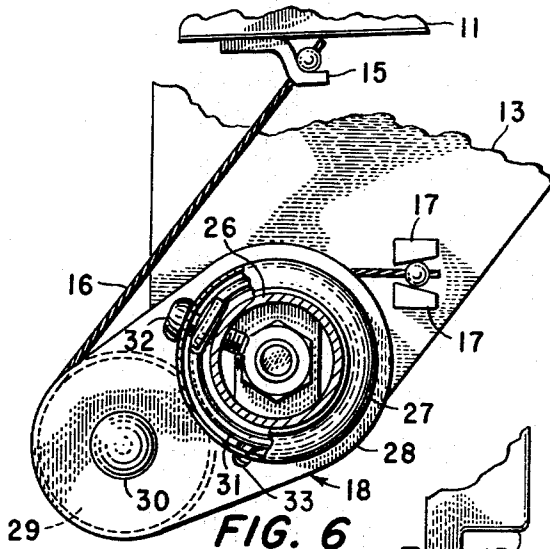
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3 Sheets-Sheet 2



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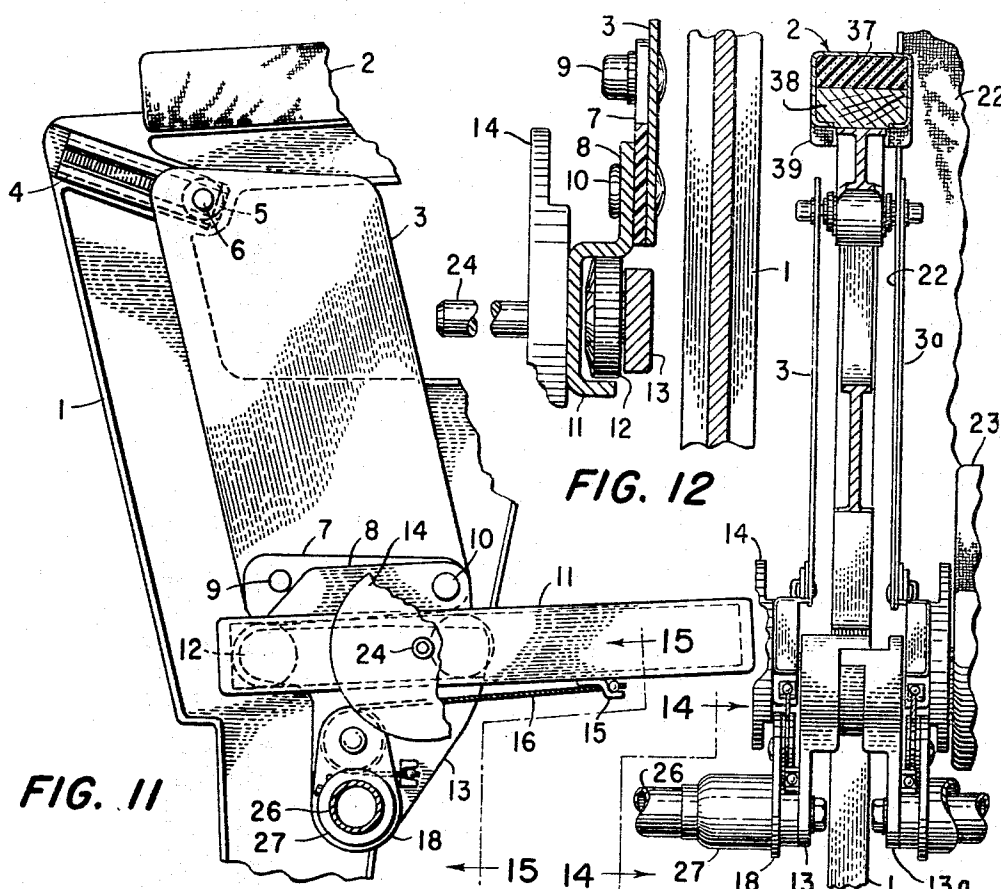


FIG. 12

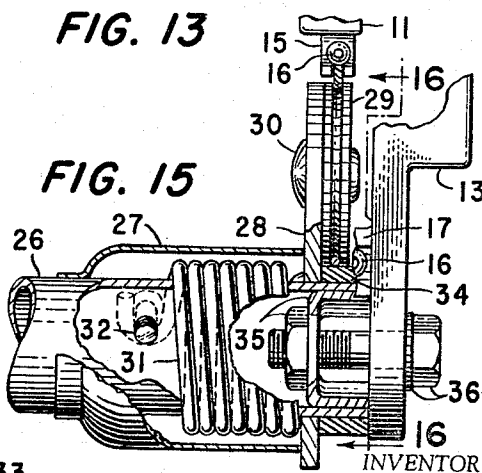


FIG. 15

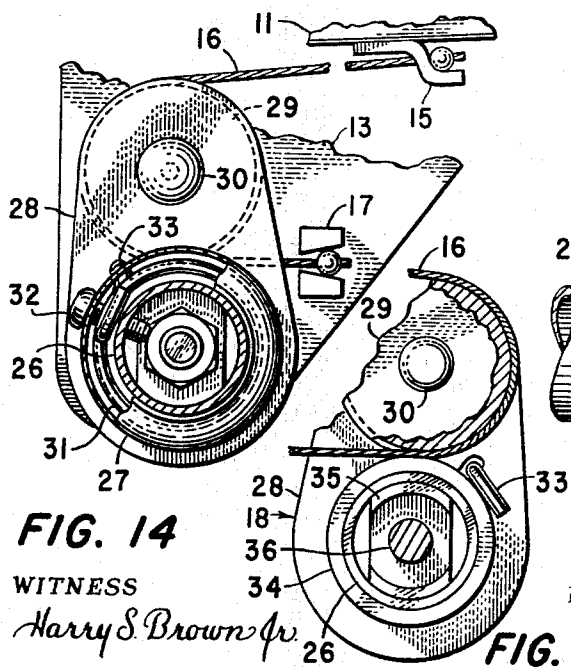


FIG. 14

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FIG. 16

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3,287,060

RETRACTING CHAIR

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6 Claims. (Cl. 297-332)

This invention relates to a retracting chair, and is particularly useful with theater chairs and chairs arranged in auditoriums and the like.

An object of the present invention is to provide a unique structure for automatically retracting the seat of a chair by means which exerts a pull substantially parallel with the movement of the seat and the slide supports therefor. A further object is to provide retracting mechanism compactly arranged in the chair structure and which provides a substantially constant spring retraction rate. Other specific objects and advantages will appear as the specification proceeds.

The invention is shown in an illustrative embodiment, by the accompanying drawings, in which—

FIGURE 1 is a perspective view of a theater chair equipped with retracting means embodying my invention, the seat and back being shown in retracted position; FIG. 2, a view similar to FIG. 1 but showing the seat in lowered position and the back in rearwardly-inclined position; FIG. 3, a broken enlarged side view in elevation of the right standard and with the retracting mechanism shown in retracted position; FIG. 4, an enlarged sectional detail view, the section being taken as indicated at line 4-4 of FIG. 3; FIG. 5, a front view in elevation of the chair standard with portions of the structure broken away, as in FIG. 3; FIG. 6, a side view, the view being taken as indicated at line 6-6 of FIG. 3; FIG. 7, a sectional view, the section being taken as indicated at line 7-7 of FIG. 8; FIG. 8, a front view partly in section of the structure shown in FIG. 6, the view being taken as indicated at line 8-8 of FIG. 5; FIG. 9, a broken view similar to FIG. 6 but with the spring-adjusting mechanism in released position; FIG. 10, an exploded view of the tube and lever mechanism showing the parts thereof and with the retracting spring shown as a left and a right spring; FIG. 11, a view similar to FIG. 3 but showing the seat-supporting means moved forwardly; FIG. 12, a sectional detail view, the section being taken as indicated at line 12-12 of FIG. 3; FIG. 13, a view similar to FIG. 4 but on a reduced scale and showing additional structure; FIG. 14, a view similar to FIG. 6 but showing the seat-supporting channels in forward position; FIG. 15, a view similar to FIG. 8 but showing the parts in tensioned or advanced position; and FIG. 16 a sectional detail view, the section being taken as indicated at line 16-16 of FIG. 15.

In the illustration given, 1 designates the right standard of a chair frame, with a portion of the arm rest designated as 2. A back wing extension 3 is shown in substantially vertical position in FIGS. 1 and 3, and behind the extension 3 are the track 4 and back pivot roller 5. A cover cap 6 extends over the pivot 5.

At the bottom of the wing extension 3, a shield plate 7 of plastic or other suitable material is employed to protect the wing against scratching by the channel hinge flange 8. The shield 7 is attached to the wing 3 by a bolt member 9. The wing 3, shield 7 and hinge flange 8 are attached by a rivet 10.

The channel hinge flange 8 is fixed to and is part of the slide channel 11. The slide channel 11 is mounted on two roller bearings 12 which are attached to the fixed support 13. The support 13 is secured to the standard on each side thereof. The seat hinge pivot casting is mounted on the slide channel 11.

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A clip 15 on the bottom side of the slide channel is employed to hold one ball fixed to the cable 16. On the support casting 13 are mounted two projections or lugs 17 which retain the pull at the other end of the cable. The cable passes around lever mechanism 18, which will be described in detail hereinafter.

As shown best in FIG. 4, the back pivot roller 5 and its track 4 are set into the rear of standard 1. Both the left and right roller and wing are shown because, in the preferred construction, the two halves of the track are welded into place in the standard and become a single unit. In FIG. 4 is also shown the shoulder bolt 19, flat washers 20 and nut 21. The nut engages bolt 6.

In FIG. 5, there is shown a portion of the back panel 22 as well as a fragment of the raised seat pan 23. There is also shown the seat hinge pivot casting 14 with its center pivot 24 and the pivot stop 25.

Below the seat hinge pivot casting 14 and mounted on the frame support 13 is secured the cross tube 26 having an enlarged spring cover 27 encircling it and next to the lever mechanism 18. 13 designates the lever support while 13a designates the right support, that is, the support on the right side of standard 1.

The lever mechanism 18 consists of a lever 28 and pulley 29 pivotally secured by a rivet 30. A retraction spring 31, as shown best in FIGS. 6 and 7, is housed within the cover 27 and extends around tube 26, one end of the spring being secured to the tube by a screw 32 which passes through the spring cover, a loop in the end of the spring 31, and into the tube 26. The loop at the other end of the spring slips through a slot 33 in the lever 28. The cable 16 is wound around the bushing 34 on the end of tube 26 and about the pulley 29. In FIG. 7, the rim is removed from the pulley to show the arrangement of the cable. In the position shown in FIG. 7, the pulley rests on the bushing 34 and travels along on it as the lever rotates.

For securing the crossbar 26 to the support 13, a special nut assembly 35 is welded inside the ends of the tube. A bolt with a lock washer 36 is inserted through the support and threaded into the nut.

In FIG. 9, the lever mechanism is shown in retracted position, and the location of the screw 32 indicates that the spring is not under tension. When the bolts 36 at each end of the tube 26 are loosened, the spring will turn the tube until all of the tension is spent, and the tube will then stop rotating, with the screw in the position shown in FIG. 9. To pre-load the spring with adequate tension to retract the chair seat, the tube is rotated, as shown by the arrow in FIG. 9, until the screw reaches the position shown in FIG. 6, and then the bolts 36 at each end of the tube 26 are tightened to keep the tube from turning in either direction.

The arm rest may be provided with foam padding 37 on top of the wood 38 and with the upholstery 39, as shown best in FIG. 13.

Operation

In the operation of the apparatus, as the seat 23 is moved forward, the cable 16 pulls the lever mechanism 18 upwardly, as shown in FIG. 14, increasing the amount of tension on the springs 31 at the ends of tube 26. At the same time, the flanges 8 which are connected to the slide channels 11 move the wing extensions 3, carrying the back of the chair forwardly to the position shown in FIG. 11. With the seat advanced and in lowered position and with the back of the seat inclined rearwardly, the chair is in a suitable position for occupancy. When the weight of the occupant is removed from the seat, the lever 28 which is under tension, as shown best in FIGS. 11 and 14, retracts the wing extensions 3 carrying the seat 23, and the pull of the cable by virtue of the lever arrange-

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ment is in a line parallel with the slide channels 11. The retracting mechanism is compactly arranged, occupying little space in the structure while at the same time providing effective retracting of the seat and back parts to the position shown in FIG. 1.

While in the foregoing specification I have shown structure in considerable detail for the purpose of illustrating embodiments of the invention, it will be understood that such details may be varied widely by those skilled in the art without departing from the spirit of my invention.

I claim:

1. In a retracting chair, a fixed frame, a pair of spaced slide channels mounted on said frame for horizontal movement, a seat pivotally mounted on said slide channels and extending therebetween, a cross tube mounted on said frame, a lever mounted on said tube having an outwardly-extending free end portion, a pulley pivotally mounted on said free end portion, a cable having one end secured to said frame and another secured to said slide channels and extending about said pulley, and spring means carried by said cross tube and engaging said lever for normally urging said lever rearwardly to retract said slide channels but yielding under tension when said slide channels are moved forwardly with said seat.

2. The structure of claim 1 in which said cross tube is provided with a bushing also receiving said cable when said slide channels are in retracted position.

3. The structure of claim 1 in which a chair back is tiltably mounted on said frame and pivotally connected to said slide channels whereby said back moves to a substantially vertical position when said slide channels are retracted.

4. In a retracting chair, a fixed frame, a pair of spaced slide channels movably mounted on roller bearings on said frame for horizontal movement, a cross tube mounted on said frame below said channels, a lever rotatably mounted on said tube and having an outwardly-extending free end portion, a pulley pivotally mounted on said free end portion, a bushing carried by said tube in alignment with said pulley, a cable fixed at one end to one of said slide channels and at the other end to said frame and

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extending about said pulley and said bushing, and spring means on said cross tube normally urging said lever downwardly to draw said slide channels to a rearwardly-retracted position.

5. The structure of claim 4 in which said spring means is a coil spring extending around said cross tube and having one end fixed to said tube and the other end fixed to said lever and being under tension for normally urging said lever downwardly in a counter-clockwise direction.

6. In a retracting chair, a chair frame, a pair of spaced slide channels mounted on said frame for horizontal movement, a seat pivotally carried by said channels, a cross tube carried by said frame below said channels, a torsion coil spring around each end of said cross tube, a lever pivotally mounted on said cross tube at each end thereof and having a free end portion equipped with a pulley, said cross tube being provided also with a bushing, and a cable at each end of said cross tube extending about said pulley and over said bushing, one end of each cable being fixed to a slide channel and the other end being fixed to said frame, said coil spring having one end secured to said cross tube and the other to said lever and being tensioned by the movement of said slide channels to forward position, said lever and pulley maintaining said cable in a generally horizontal direction parallel with the slide channel when the slide channel is in forward position.

References Cited by the Examiner

UNITED STATES PATENTS

379,449	3/1888	Condell	5—164
492,706	2/1893	Brenner	5—164
1,246,209	11/1917	Witter	297—342
2,169,486	8/1939	Dorton	297—342
2,268,914	1/1942	Vandervoort	297—332
2,273,428	2/1942	Bank	297—304
2,500,124	3/1950	Hoven	297—342
2,674,303	4/1954	Dorton	297—342

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