

Sept. 20, 1971

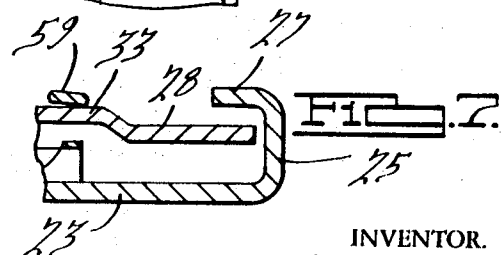
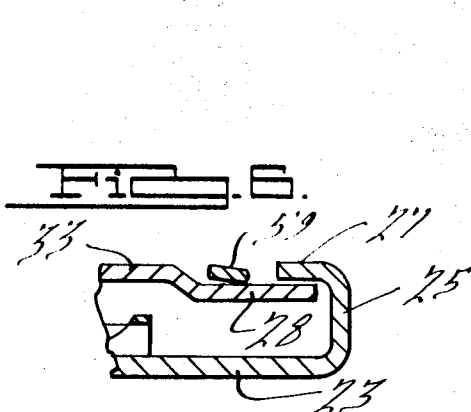
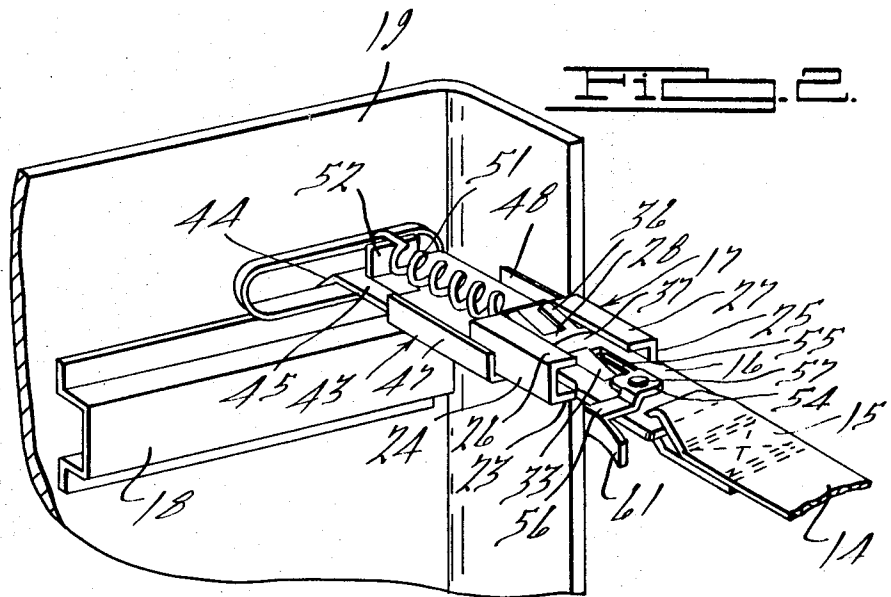
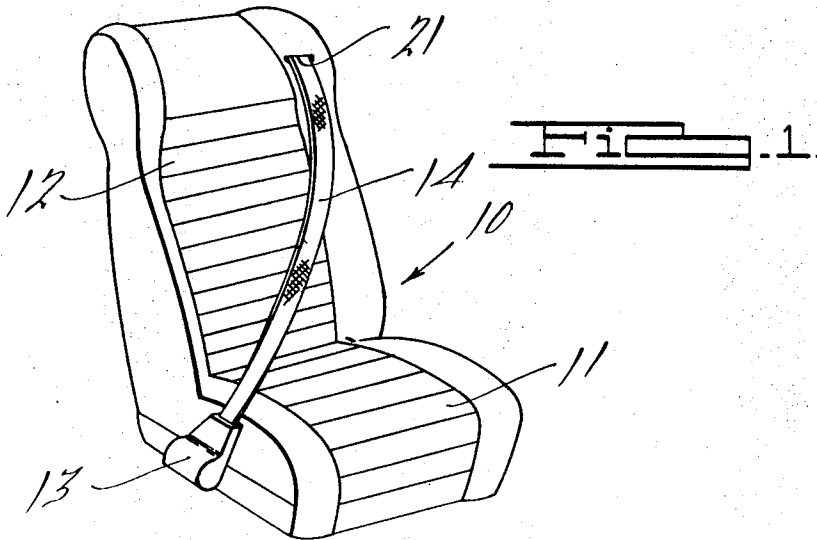
D. C. CAZABON

3,606,456

SEATBELT SYSTEM

Filed Aug. 3, 1970

2 Sheets-Sheet 1



INVENTOR.
Dennis C. Cazabon
BY *John R. Faulkner*
John J. Roethel
ATTORNEYS.

Sept. 20, 1971

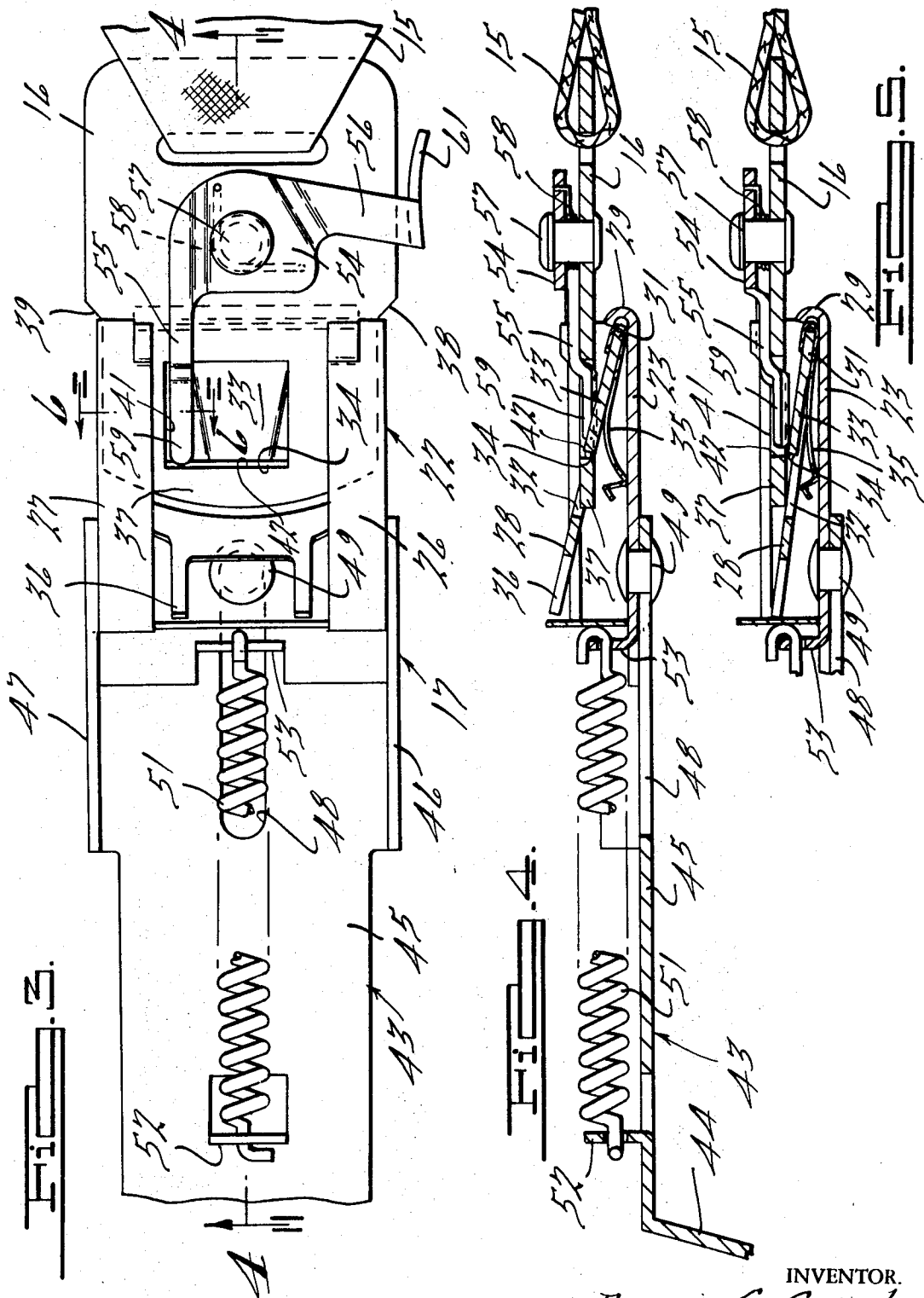
D. C. CAZABON

3,606,456

SEATBELT SYSTEM

Filed Aug. 3, 1970

2 Sheets-Sheet 2



INVENTOR.
Dennis C. Cazabon
BY
John R. Faulkner
John J. Rothel
ATTORNEYS.

1

3,606,456

SEATBELT SYSTEM

Dennis C. Cazabon, Grosse Pointe, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Aug. 3, 1970, Ser. No. 60,488

Int. Cl. A44b 11/20; A47d 17/00; B60r 21/10

U.S. Cl. 297—388 9 Claims

ABSTRACT OF THE DISCLOSURE

A seatbelt system in which the buckle device adapted to receive a tongue member secured to the free end of a seatbelt is mounted on a seat frame and is enclosed, except for an access aperture, by the heat upholstery trim. The buckle device is slidably mounted on a guide and is springloaded to be urged into a retracted position. The tongue member when coupled to the buckle device also becomes concealed. Upon a pull being exerted on the belt in a direction away from the seat trim, the coupled buckle device and tongue member are pulled through the aperture a sufficient distance to expose a latch release actuator mounted on the tongue member. This actuator is operable to disengage the latch plate of the buckle device from the tongue member to permit the latter to be uncoupled from the buckle means.

BACKGROUND OF THE INVENTION

One of the undesirable aspects of seatbelt passenger restraint systems is the clutter of seatbelt buckle devices and tongue devices which must be coupled to one another to provide seat occupant engirdling restraints.

It is an object of the present invention to reduce the number of visible buckle devices by concealing selected ones within the trim upholstery of the seat structure.

SUMMARY OF THE INVENTION

The seatbelt system for a vehicle seat embodying the present invention comprises a buckle means including a latch. The buckle means is slidably supported on a guide means within the seat structure. Spring means normally retracts the buckle means along the guide means to hold the latter within the seat structure. A tongue means is carried on one end of the seat belt and is adapted to be held and coupled in engagement with the buckle means by the latch. The tongue means has a latch actuating device mounted thereon. When coupled together in normal passenger restraint condition, the coupled buckle means and tongue means including the actuating device on the tongue means, are concealed within the seat structure. If it is desired to unbuckle the seat belt, the application of a pulling force on the belt sufficient to overcome the resistance of the spring means causes the buckle to move outwardly along the guide means to a position in which the actuating device on the tongue is accessible for actuation to disengage the latch plate on the tongue means to uncouple the latter from the buckle means.

DESCRIPTION OF THE DRAWINGS

Other objects, advantages and features of the present invention can be made more apparent as this description proceeds, reference being had to the accompanying drawings, wherein:

FIG. 1 is a perspective view of a vehicle seat and seat belt system as embodied in the present invention;

FIG. 2 is a perspective view on an enlarged scale of a portion of the seat structure illustrating in particular the relationship of the buckle means and associated seat belt tongue member when coupled to each other;

2

FIG. 3 is an enlarged plan view of the structure shown in FIG. 2;

FIG. 4 is a sectional view on the line 4—4 of FIG. 3;

FIG. 5 is a view in part similar to FIG. 4 showing the relationship of the buckle means latch plate to the tongue means prior to disengagement of the tongue from the buckle means;

FIG. 6 is a view on the line 6—6 of FIG. 3 illustrating the relationship of the tongue mounted latch plate actuating lever to the buckle means latch plate when the buckle means and tongue means are coupled to each other; and

FIG. 7 is a view in part similar to FIG. 6 illustrating the relationship of the tongue mounted latch plate actuating lever to the buckle means latch plate to condition the buckle means and tongue member for disengagement as shown in FIG. 5.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to the drawings, and first to FIG. 1, there is shown a vehicle seat 10 having a seat cushion 11 and a backrest 12. At one side of the seat cushion 11 is mounted a seat belt retractor mechanism 13.

The internal mechanism of the retractor mechanism forms no part of the present invention nor is it material whether the retractor mechanism is mounted to the seat frame or the vehicle floor board. Adapted to be retracted into or extending from the retractor mechanism 13 is a seat belt 14 which is illustrated as being of the chest or shoulder harness type, that is, one that extends diagonally across the upper torso of the seat occupant. At its free end 15, as best seen in FIG. 2, the belt 14 terminates in a metal tongue 16 to be more fully described.

The tongue 16 is adapted to be received in a buckle device, generally designated 17 which, in accordance with the present invention, is mounted on a backrest frame member 18 and is enclosed in a recessed section 19 of the backrest except for an access aperture 21 in the backrest upholstery trim.

The buckle device 17 comprises a buckle casing 22 having a base 23 formed with upstanding walls 24 and 25 on two opposite sides thereof. The side walls 24 and 25 terminate in inwardly turned flanges 26 and 27. A latch member or plate 28 is supported on the base 23, the latter having at one end a turned over laterally extending flange 29 against which the end 31 of the latch plate 28 pivotally abuts. The latch plate 28 has a centrally located laterally extending aperture 32 with an upwardly inclined boss section 33 the edge 34 which has a latching function, as will become apparent. The latch plate 28 is urged at an upwardly inclined relationship to the base 23 by a curved leaf spring 35. At the end 36 opposite its pivoted end 31 the latch plate 28 is laterally narrower to the extent that it is able to project between the flanges 26—27 so that in unlatched and latched position it is able to attain an angle approximating that shown in FIG. 4.

The tongue 16 has a pilot portion 37 which slidably fits between the side walls 24—25 of the buckle device. Rearwardly of the pilot portion 37, the tongue is wider and the corner edges 38 and 39 function as stops to limit the extent to which the tongue 16 is insertable into the buckle casing.

The pilot portion 37 of the tongue member 16 has a rectangular aperture 41 the leading edge 42 of which functions as a latching surface to coact with the latching edge 34 on the latch plate 28.

Assuming that the buckle device and the tongue member are in uncoupled relationship, the coupling of the two together would be accomplished as follows: Pilot portion 37 of the tongue member 16 would be inserted in the buckle casing 22 over its edge 29 which would place it

3

over the latch plate 28 and beneath the flanges 26 and 27. As the tongue member 16 is forced inwardly into the buckle casing 22, the latch plate 28 is swung downwardly against the spring 35 until the leading edge of the pilot portion 37 enters the laterally extending aperture 32 in the latch plate 28. At about the time the edges 38-39 of the latch plate 16 abut the end edges of the upstanding walls 24-25, the inclined embossed section 33 on the latch plate 28 becomes aligned with the aperture 41 in the tongue. Spring 35 urges the latch plate 28 upwardly to the position shown in FIG. 4 in which position the latching edge 42 of the tongue is in abutting relationship to the latching edge 34 on the latch plate 28 and the tongue cannot be withdrawn from the buckle casing 22. The foregoing structure is somewhat conventional.

In a conventional buckle assembly a lever or a push-button located above the flanges 26 and 27 would be provided to exert a downward pressure on the latch plate 28 to permit withdrawal of the tongue 16. It will be noted, however, that the belt or harness 14 or at least the free end 15 of the latter, extends into the seat structure through the aperture 21 when in latched condition and a conventional pushbutton or release lever would not be accessible for release actuation.

Accommodation is made for this condition by slidably mounting the buckle casing 22 on a combination bracket-guide member 43. The bracket-guide member 43 has an angularly related end portion 44 which may be welded or bolted to the frame member 18 of the backrest 12. The main plate portion 45 of the bracket-guide member 43 has on its end opposite the end portion 44 upstanding flanges 46 and 47 between which the buckle casing 22 is adapted to have a slidable fit.

The main plate portion 45 has a longitudinally extending slot 48. A rivet 49 projects through the base 23 of the buckle casing 22 and through the slot 48 to hold the two together during the relative longitudinal sliding movements therebetween.

A tension spring 51 extends between a tab 52 projecting upwardly from the bracket main plate portion 45 and a tab 53 projecting upwardly from the base 23 of the buckle casing 22.

The tongue 16 has pivotally mounted on its upper surface a lever 54 having a first arm or finger 55 which extends generally longitudinally of tongue 16 and a second arm 56 which extends laterally of the tongue. The lever 54 is pivotally mounted on the tongue 16 by a pivot stud 57 and is spring urged to swing in a clockwise direction, as viewed in FIG. 4 by a spring 58. Such clockwise movement of lever 54 is limited by the abutting relationship between the end 59 of the first arm 55 of the lever 54 and the adjacent edge of the aperture 41 in the tongue 16. The end 59 of the first arm 55 extends downwardly and then into the plane of the aperture 41 in the tongue. As best seen in FIG. 6, the end 59 of the arm 55 lies to one side of the projection 33 on the latch plate 28. When the lever 54 is actuated in a counterclockwise direction by the application of finger pressure on the flange 61 on the end of the second arm 56 of the lever 54, the end 59 of the lever arm 55 depresses the latch plate as shown in FIGS. 5 and 7 by permitting withdrawal of the tongue 16 from latched position in the buckle casing 22.

OPERATION

From a stored position in the retractor 13, the belt or harness 14 is put on by grasping the tongue 16 with the hand nearest the retractor and carrying this tongue up and over the torso, inserting the tongue 16 over the shoulder into the aperture 21 in the seat back. The buckle device 17 will be in a retracted position. The tongue 16 is of sufficient length so that it may be inserted into the aperture 21 to engage the buckle device 17 in latching relationship as shown in FIG. 4. It will be understood that the spring 51 will remain in a compressed condition with the buckle device 17 at the left end of the

4

slot 48 as viewed in the drawings. To remove the shoulder harness of belt 14, the tongue 16 is extended from the seat back by pulling on the shoulder harness with the left hand. Under such pulling force, the spring 51 will be extended permitting a portion of the buckle device 17 and the tongue 16 latched thereto to move sufficiently outwardly of the aperture 21 in the seat back exposing the tongue 16 and the lever 54 mounted thereon. The tongue 16 is then grasped with the right hand and the release lever 54 squeezed. This causes the release lever to be rotated in a counterclockwise direction as viewed in the drawing so that the finger 59 on the end of the arm 55 depresses the latch plate 28 as previously described. When the latch plate is depressed, the tongue 16 may be retracted from the buckle device 17 and the tongue is then retracted into the retractable device 13 and stored. Upon disengagement of the tongue 16, the buckle casing 22 is retracted toward the rear of the backrest by the spring 51.

It will be understood that the invention is not to be limited to the exact construction shown and described but that various changes and modifications may be made without departing from the spirit and scope of the invention.

1. A seatbelt system for a vehicle seat structure, comprising:

a buckle means including a latch,
guide means within the seat structure slidably supporting the buckle means,
spring means normally retracting the buckle means along the guide means,
and tongue means carried on one end of a seatbelt adapted to be held in coupled engagement with the buckle means by the latch,

the tongue means having a latch actuating device thereon engageable with the latch when the tongue means is coupled to the buckle means,

the coupled buckle means and tongue means, including the actuating device on the latter, being concealable within the seat structure in normal passenger restraint condition of the seat belt and being movable out of concealment against the resistance of the spring means to a position in which the actuating device is accessible for actuation to disengage the latch from the tongue means to uncouple the latter from the buckle means.

2. A seatbelt system according to claim 1, in which: the latch actuating device on the tongue means comprises a pivotally mounted lever having a first arm extending longitudinally of the tongue means in latch abutting position when the tongue means is coupled to the buckle means,

the lever having a second arm extending laterally of the first arm and adapted to be manipulated to pivot the lever in a direction to cause the first arm thereon to disengage the latch from the buckle means.

3. A seatbelt system according to claim 1, in which: the spring means comprises a tension spring extending from the guide means to the buckle means.

4. A seatbelt system according to claim 1, in which: the latch actuating device on the tongue means comprises a pivotally mounted lever having a first arm extending longitudinally of the tongue means in latch abutting position when the tongue means is coupled to the buckle means,

the lever having a second arm extending laterally of the first arm and adapted to be manipulated to pivot the lever in a direction to cause the first arm thereon to disengage the latch from the buckle means,

and the spring means comprises a tension spring extending from the guide means to the buckle means.

5. A seatbelt system for a vehicle seat having a seat cushion and a backrest, comprising:

a seatbelt,

5

- a retraction device anchored at one side of the cushion to which the seatbelt is coupled at one of its ends for retraction and extension to and from seat occupant restraint condition,
- a buckle means to which the tongue means is adapted 5 to be coupled by a latch plate contained within the buckle means,
- a bracket guide member slidably supporting the buckle means on a frame member within the backrest,
- an access aperture in the seat backrest trim providing 10 access to the buckle means,
- spring means normally retracting the buckle means on the bracket guide member interiorly of the backrest away from the access aperture,
- a tongue means on the other end of the seatbelt having 15 a latch plate engaging portion and a latch plate actuating device thereon,
- the tongue means being adapted to be inserted through the access aperture into coupled engagement with the buckle means, 20
- the coupled buckle means and tongue means, including the actuating device on the latter, being concealed within the backrest trim in normal extension of the seatbelt and being movable out of the backrest aperture against the resistance of the spring 25 means to a position in which the latch plate actuating device is accessible for actuation to disengage the latch plate from the tongue means and thereby the latter from the buckle means to permit retraction of the seatbelt. 30
6. A seatbelt system according to claim 5, in which: the spring means comprises a tension spring extending from the buckle support to the buckle means.
7. A seatbelt system according to claim 5, in which: 35 the latch plate actuating device on the tongue means comprises a pivotally mounted lever having a first arm extending longitudinally of the tongue means in latch plate abutting position when the tongue means is coupled to the buckle means,
- 40 the lever having a second arm extending laterally of the first arm and adapted to be manipulated to pivot the lever in a direction to cause the first arm thereon to disengage the latch plate from the buckle means.
8. A seatbelt system according to claim 7, in which: the spring means comprises a tension spring extending 45 from the buckle support to the buckle means.
9. In a vehicle seatbelt buckle and tongue assembly:

6

- a buckle casing having a base formed with upstanding side walls on two opposite sides thereof,
- the side walls terminating in inwardly turned flanges;
- a tongue member insertable from one end of the casing over the base, between the side walls and beneath the flanges thereon,
- the tongue member having an aperture therein one edge of which is a latching surface;
- a latch member supported on the base of the buckle casing for pivotal movement about the end of the latter into which the tongue is insertable,
- the latch member having a latching projection thereon complementary to the latching surface of the tongue member;
- spring means between the base and the latch member urging the latter at an upwardly inclined angle from the tongue insertable end of the casing into engagement with the flanges,
- the tongue member when inserted into the casing between the latch member and the flanges depressing the latch member until the latch projection thereon is aligned with the tongue member aperture whereupon the spring means is effective to restore the latch member to its angular position with the latching projection engaging the latching surface on the aperture one end to hold the tongue member against withdrawal from the buckle casing;
- the improvement comprising a lever pivotally mounted on the tongue member,
- the lever having an arm projecting into the tongue member aperture in abutting relation to the latch projection,
- the lever being manipulable to swing the arm over the latch projection to depress the latch member to a position out of engagement with the tongue member latching surface to permit withdrawal of the tongue member from the casing.

References Cited

UNITED STATES PATENTS

3,288,528	11/1966	Broad et al.	297—388
3,496,615	2/1970	Krengel	24—230A
3,533,141	10/1970	Unai	24—230A

45 CASMIR A. NUNBERG, Primary Examiner

U.S. Cl. X.R.

24—230A, 163A; 280—150SB