

July 5, 1927.

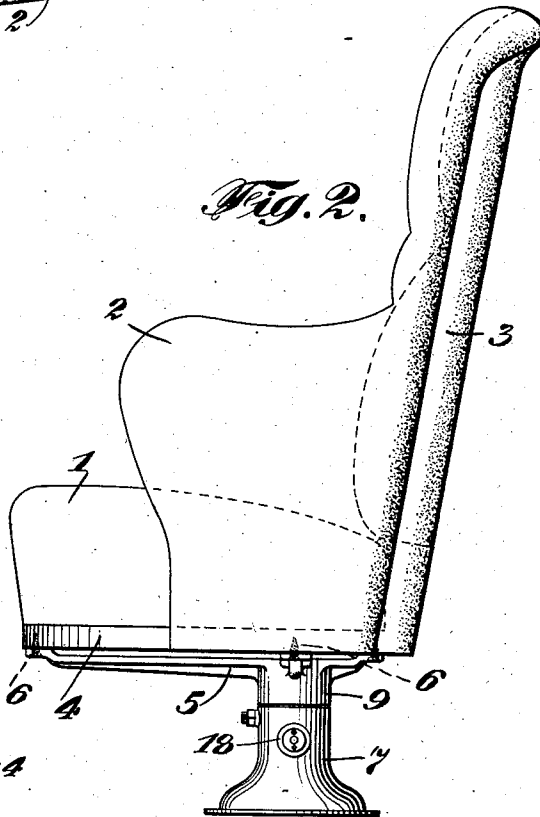
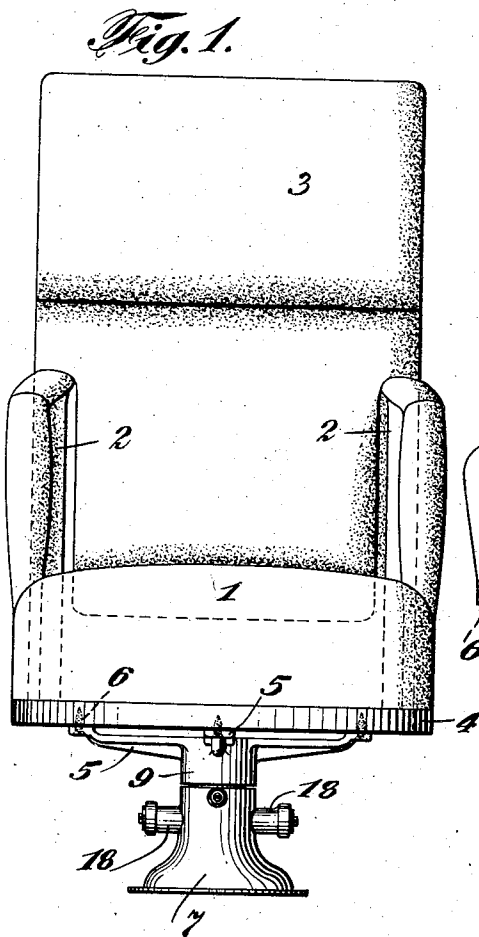
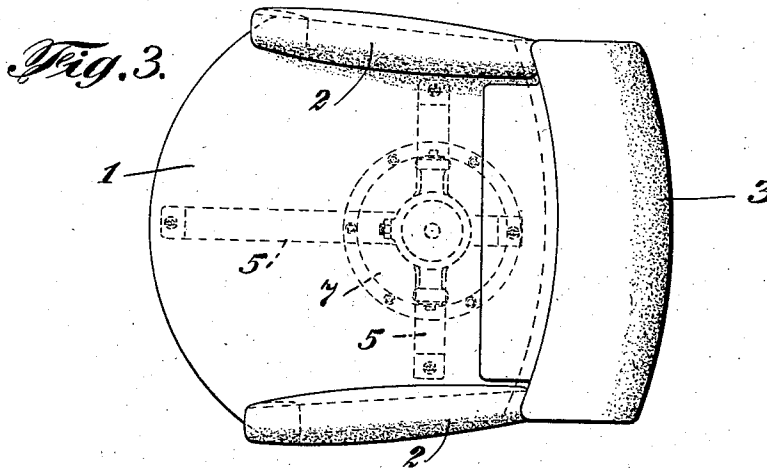
R. F. STUBBLEBINE ET AL

1,634,922

REVOLVING CHAIR

Filed April 18, 1924

7 Sheets-Sheet 1



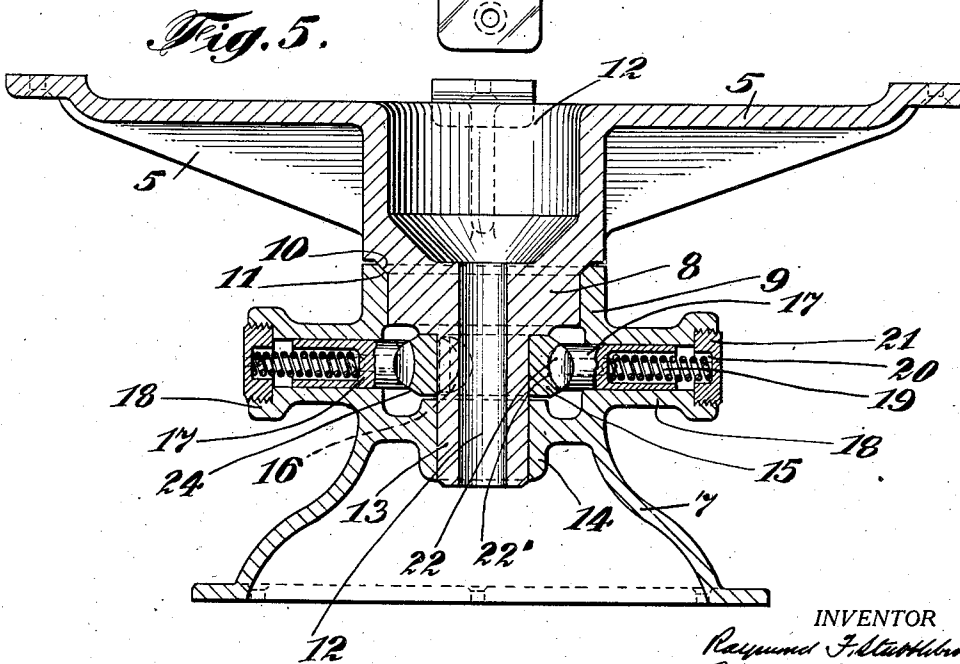
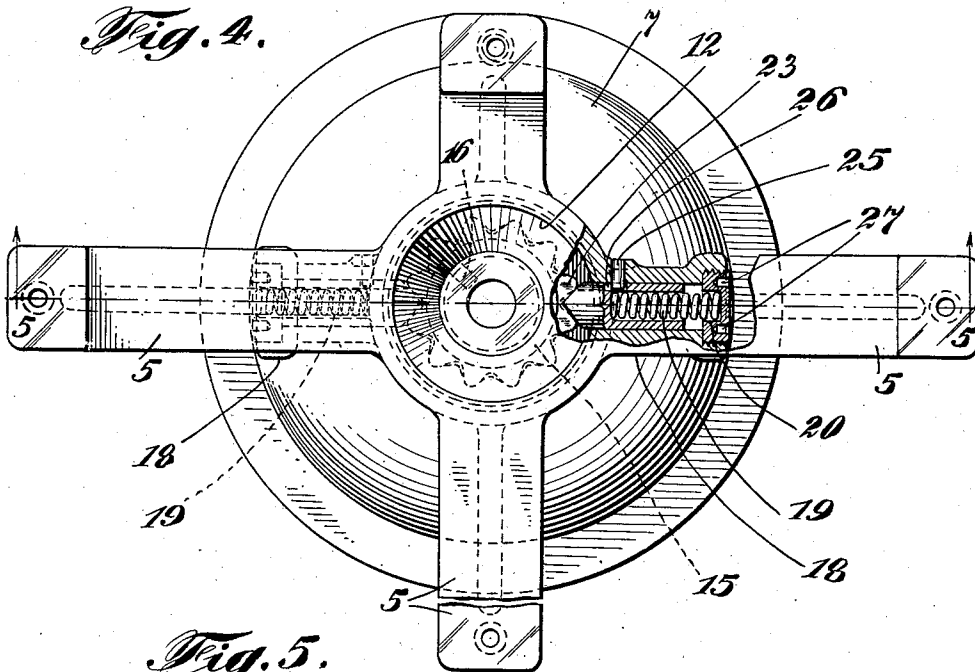
INVENTOR
Raymond F. Stubblebine
BY Joseph V. Nolan
ATTORNEY

1,634,922

REVOLVING CHAIR

Filed April 18, 1924

7 Sheets-Sheet 2



INVENTOR

Raymond F. Stubblebine
Joseph V. Dolan

BY

ATTORNEY

July 5, 1927.

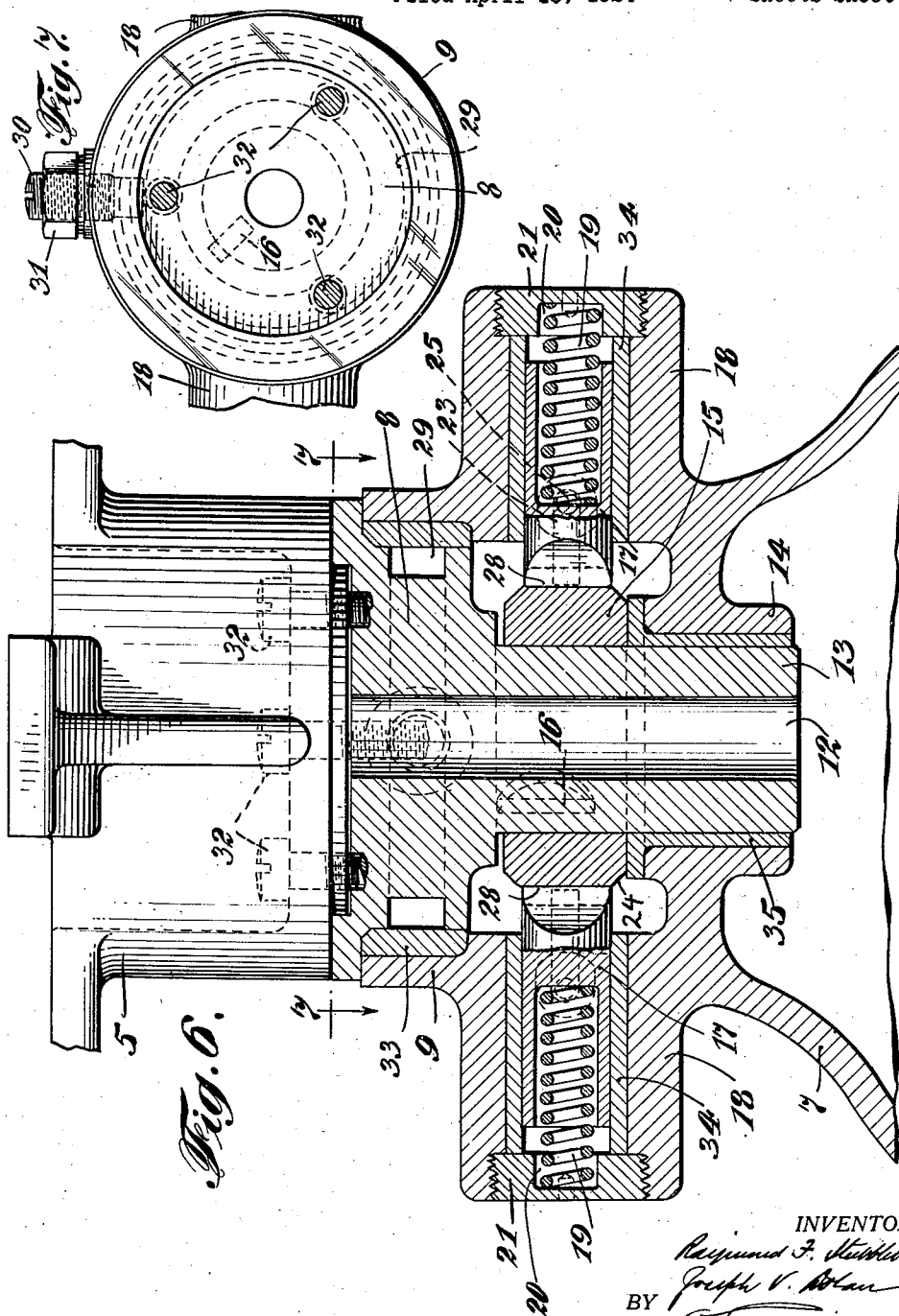
R. F. STUBBLEBINE ET AL

1,634,922

REVOLVING CHAIR

Filed April 18, 1924

7 Sheets-Sheet 3



INVENTOR
Raymond F. Stubblebine
 BY *Joseph V. Nolan*
P. Edmunds
 ATTORNEY

July 5, 1927.

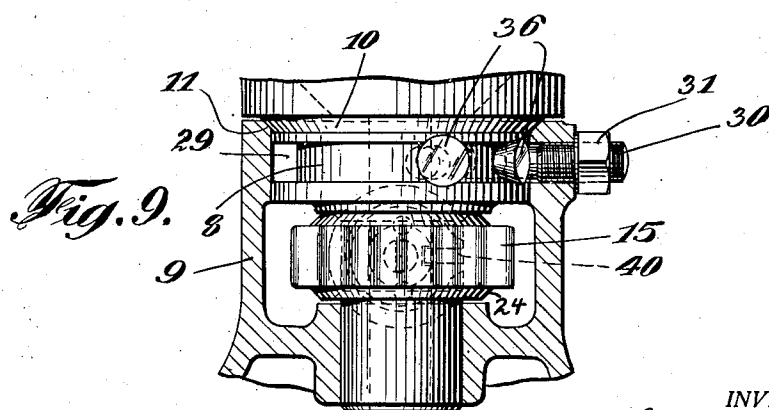
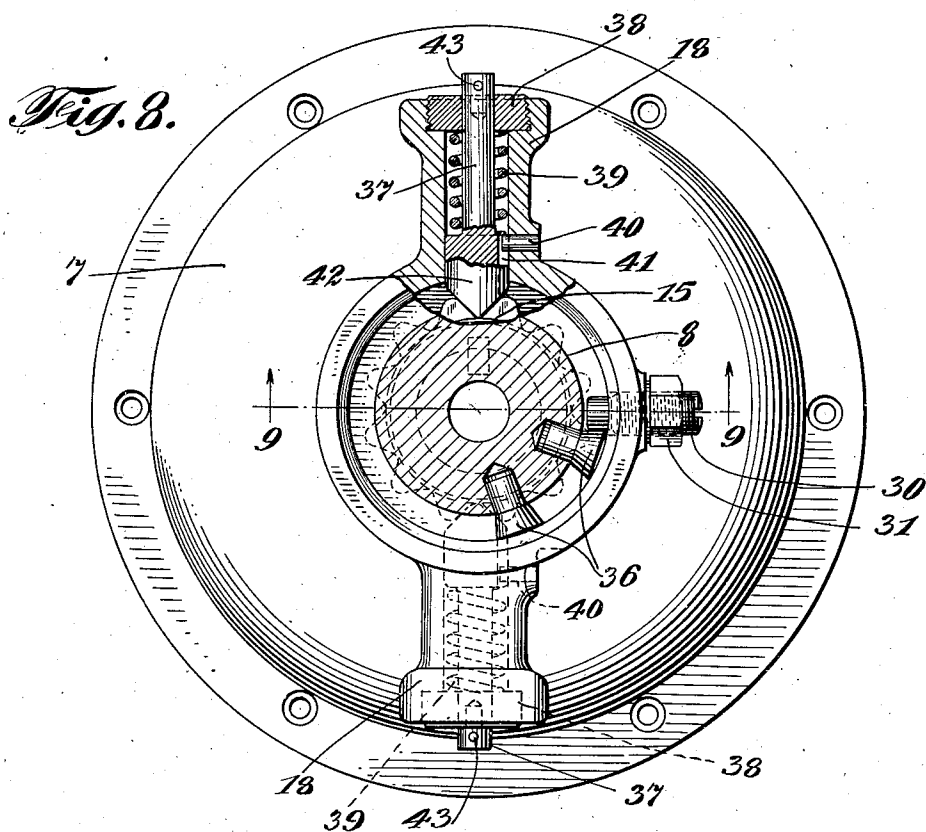
1,634,922

R. F. STUBBLEBINE ET AL

REVOLVING CHAIR

Filed April 18, 1924

7 Sheets-Sheet 4



INVENTOR
Raymond F. Stubblebine
Joseph V. Nolan
BY
[Signature]
ATTORNEY

July 5, 1927.

R. F. STUBBLEBINE ET AL

1,634,922

REVOLVING CHAIR

Filed April 18, 1924

7 Sheets-Sheet 5

Fig. 10.

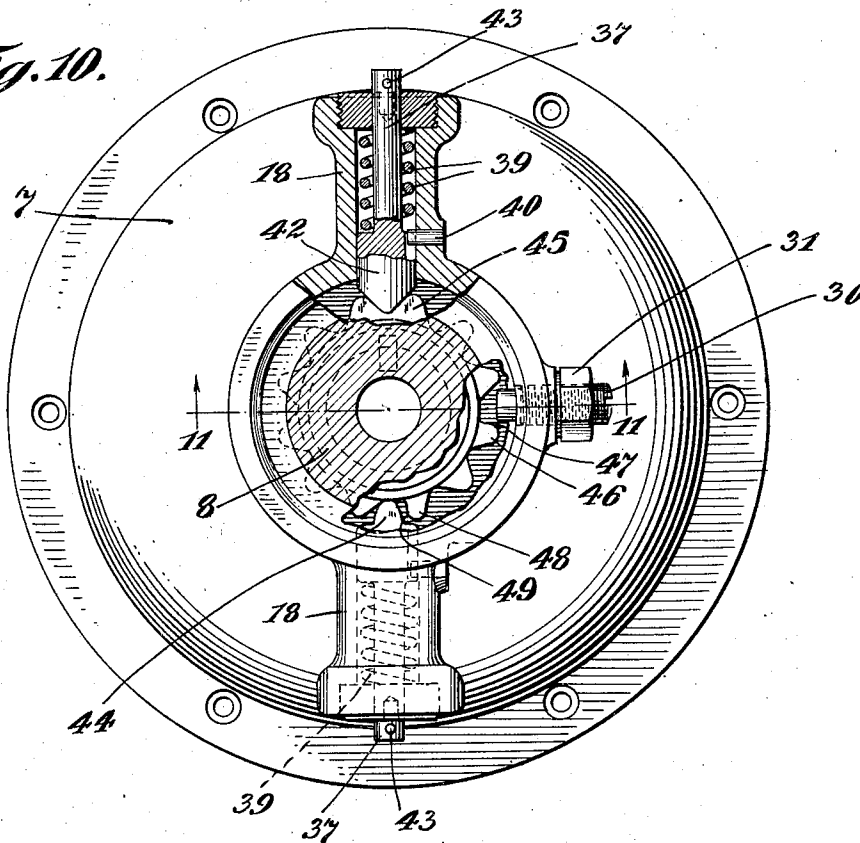
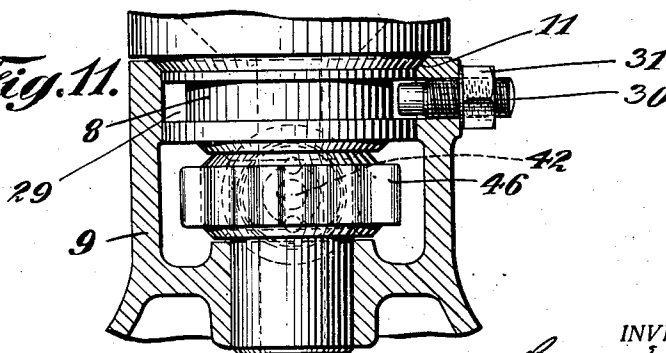


Fig. 11.



INVENTOR
Raymond F. Stubblebine
Joseph V. Nolan
 BY *J. P. Edmunds*
 ATTORNEY

July 5, 1927.

1,634,922

R. F. STUBBLEBINE ET AL

REVOLVING CHAIR

Filed April 18, 1924

7 Sheets-Sheet 6

Fig. 12.

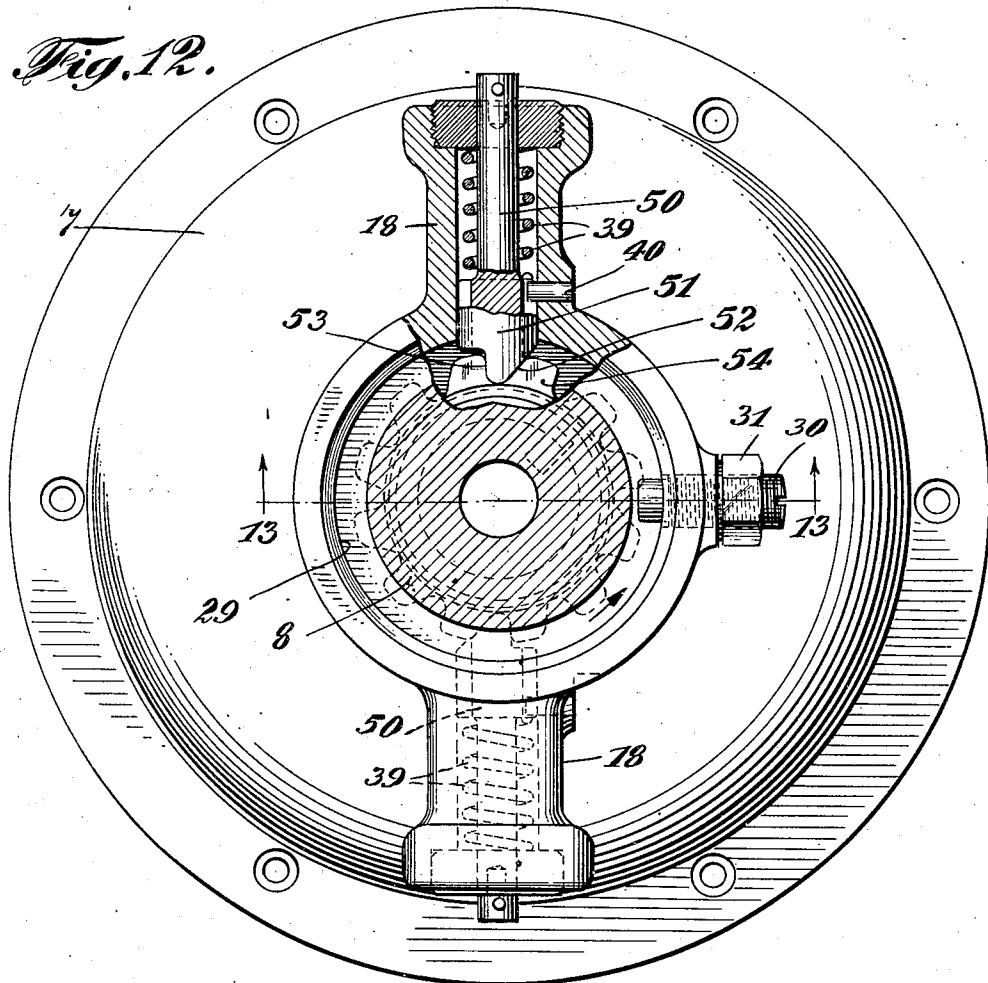
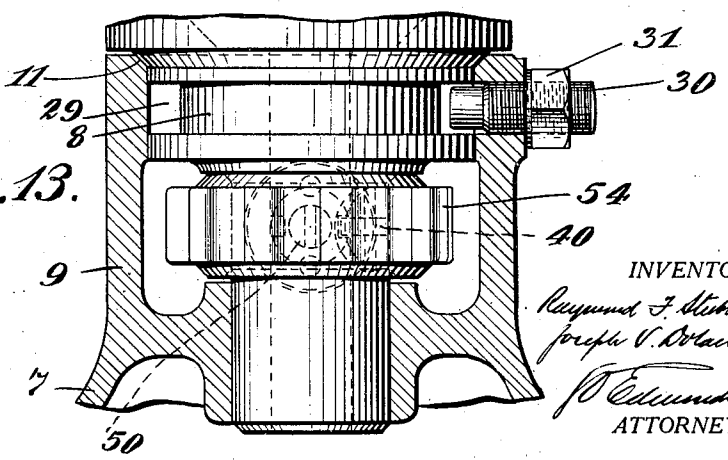


Fig. 13.



INVENTOR

Raymond F. Stubblebine
Joseph V. Dolan

J. E. Edwards
ATTORNEY

July 5, 1927.

R. F. STUBBLEBINE ET AL

1,634,922

REVOLVING CHAIR

Filed April 18, 1924

7 Sheets-Sheet 7

Fig. 14.

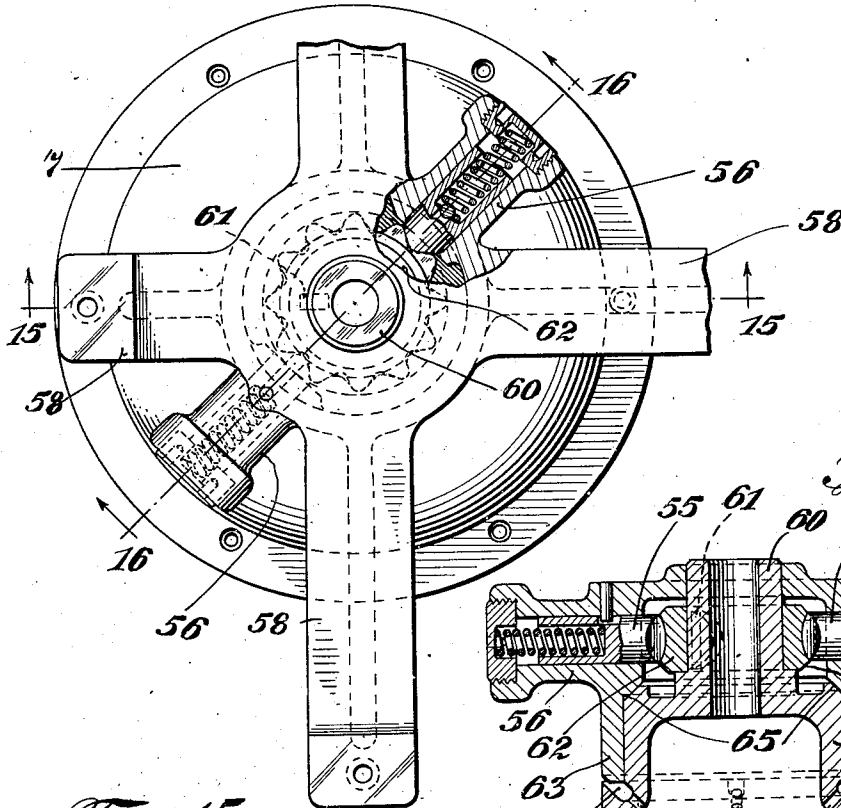


Fig. 16.

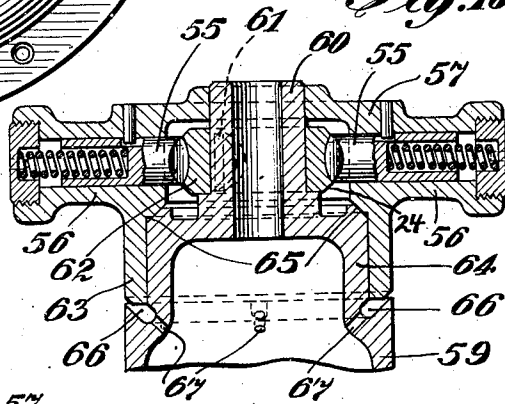
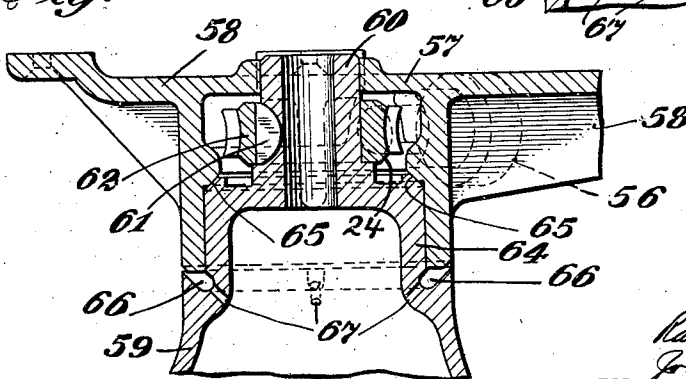


Fig. 15.



INVENTOR
Raymond F. Stubblebine
Joseph V. Kline
 BY *J. Edwards*
 ATTORNEY

UNITED STATES PATENT OFFICE.

RAYMOND F. STUBBLEBINE, OF PHILADELPHIA, AND JOSEPH V. DOLAN, OF ARDMORE, PENNSYLVANIA, ASSIGNORS TO THE AMERICAN MOTOR BODY CORPORATION, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF DELAWARE.

REVOLVING CHAIR.

Application filed April 18, 1924. Serial No. 707,345.

Our invention relates to chairs and more particularly relates to revolving chairs for vehicles, such as automobile buses, railway cars, and the like.

It is a well recognized fact that in passenger vehicles, and especially in automobile buses and in suburban electric or gasoline railway cars, and the like, the seating should be arranged to conserve space to the utmost and to afford a maximum of seating capacity, while at the same time permitting a passenger free and ready access to and departure from each seat, and an unobstructed passage into and out of the vehicle. The chairs themselves should be comfortable. The chairs, if revolvable, should be so designed that a person may revolve them readily and easily into a desired position, but will not revolve by reason of the jarring, lurching or swaying of the vehicle. The chairs should also be strong and durable to withstand the hard usage of travel and it is preferable that they be light in weight, simple in construction and inexpensive to manufacture, repair and install.

The principal objects of our invention are to provide a revolving chair which is especially well suited for vehicular use, and a chair which has all the desirable features and advantages noted above.

Accordingly, the objects of our invention include the provision of an improved revolving chair construction and assembly whereby close dimensions, compactness of shape, comfort and durability is attained, and to provide a chair which has a small turning radius and in which the pitch of cushion and back, the width and height of bustle, angle of head rest and adequate spring work all combine to render the chair very comfortable.

More particularly, our objects also include the provision of improved means which permit the chair to be revolvable by hand into any desired position without requiring the manipulation of hand catches or levers of any kind, and which also prevent the chair from revolving as a result of movements of the vehicle, especially in passing around curves.

Our objects also include the provision of simple means whereby the chair may be conditioned for full rotation in both directions, or for full rotation in one direction only and not at all in the other direction, or for limited rotation, said means permitting the chair to be changed from one condition to another readily and easily, and necessitating merely a simple adjustment or interchange of certain parts to effect such change. Our objects also include the provision of means which positively hold the chair in place on its pedestal irrespective of the position of the vehicle, and even should the vehicle turn over on its side or top, for instance, as a result of a collision or accident.

Other objects of our invention will be in part obvious and in part pointed out hereinafter.

Accordingly, our invention consists in the features of construction and the combination of elements and arrangement of parts which will be exemplified in the constructions hereinafter set forth and the scope of the application of which will be indicated in the claims which will follow.

In accordance with our invention the seat cushion, arms and back are supported by a spider which, in turn, is revolvably supported by a pedestal. One of these elements, either the spider or the pedestal, has a vertical central hub portion which seats in a vertical sleeve-like portion of the other element to eliminate lost motion and prevent wobbling between the two elements. The hub carries rigidly a gear-like member against which is pressed yieldingly one or more latches which are carried in the other element. The ends of these latches are adapted to engage between any two teeth of the gear-like member to restrain relative rotation between the spider and the pedestal. When both side faces of the latches are bevelled and the sides of the teeth of the gear-like member are correspondingly inclined the chair may be revolved in either direction. The engagement of the latches with the gear-like member is such that the spider is held thereby against rotation on the pedestal due to swaying movements, or

sudden stopping and starting movements of the vehicle, but at the same time permitting a person to rotate the chair into any desired position by grasping the back of the chair and giving the chair a quick sharp turn. This act of the person causes the latches to be cammed outwardly by the gear teeth and causes the latches to ride over the teeth until the chair is in the desired position. Then the pressure means, acting on the latches, causes them to seat between the adjacent gear teeth and the latches act to hold the chair in place. Preferably, springs are employed to continually urge the latches toward, and to yieldingly hold them in engagement with, the gear member with the desired degree of force. By merely changing the shape of all or only special ones of the gear teeth, and changing the shape of the engaging end or ends of one or both latches, the chair may be conditioned for rotation in one direction only or for partial rotation in various amounts. The above features, as well as other features of the construction, will be described and referred to more fully hereinafter.

In order that a clearer understanding of our invention may be had, attention is hereby directed to the accompanying drawings, forming a part of this application, and illustrating certain possible embodiments of the invention. Referring to the drawings, Fig. 1 is a front view of a revolving chair embodying our invention; Fig. 2 is a side view of the chair; Fig. 3 is a top view of the chair; Fig. 4 is a top view of the seat supporting mechanism, permitting full revolution in both directions, certain portions being broken away for the sake of clearness; Fig. 5 is a sectional view of the same, and is taken on the line 5—5 of Fig. 4; Fig. 6 is a front view, partly in section, of a modified form of the supporting structure, and incorporating auxiliary means for preventing bodily removal of the spider from the pedestal; Fig. 7 is a top view of a portion thereof, on a reduced scale, and is taken on the line 7—7 of Fig. 6; Fig. 8 is a sectional view illustrating a modified construction incorporating means for preventing full rotation of the chair in either direction; Fig. 9 is a sectional view of the same, and is taken on the line 9—9 of Fig. 8; Fig. 10 is a sectional view illustrating a modified form of latching mechanism which prevents full rotation of the chair in either direction; Fig. 11 is a sectional view of the same, and is taken on the line 11—11 of Fig. 10; Fig. 12 is a sectional view of a modified form of latching mechanism which permits rotation of the chair in one direction only; Fig. 13 is a sectional view of the same, and is taken on the line 13—13 of Fig. 12; Fig. 14 is a top view of a modified seat supporting structure, wherein the latches are mounted on the

spider instead of on the pedestal, and the gear-like member is mounted on the pedestal instead of on the spider, certain parts being broken away and others being shown in section for the sake of clearness; Fig. 15 is a sectional view of the same, and is taken on the line 15—15 of Fig. 14; and Fig. 16 is another sectional view of the construction, and is taken on the line 16—16 thereof. Similar reference characters refer to similar parts throughout the several views of the drawings.

Referring to the drawings, the chair comprises a seat cushion 1, a pair of arms 2, and a seat back 3, all mounted on a suitable base plate or frame 4. These parts are supported on a spider member 5, preferably metal, which is secured to the base plate 4 in any suitable manner, as by means of screws 6. The spider 5 is supported for horizontal rotation on a pedestal 7 which is adapted to rest on and be secured to the floor of a vehicle or other structure.

In a preferred construction the spider 5 has a depending hub portion which is rotatably seated in the pedestal 7 which is hollow. The spider hub has a comparatively large portion 8 which fits snugly, but for free rotation, within an upper circular sleeve portion 9 of the pedestal, there being a bevelled bearing surface 10 on the spider which seats on a bevelled bearing surface 11 on the pedestal portion 9. The hub also comprises a lower smaller portion 13 which fits snugly for rotation in another sleeve portion 14 of the pedestal. This construction permits free and smooth rotation of the spider in the pedestal and at the same time prevents the spider and the seat supported thereby from wobbling on the pedestal. The spider may be hollow, as at 12, to lessen the weight. Intermediate the portions 8 and 13 of the hub the pedestal 7 provides room for the accommodation of latching mechanism adapted to yieldingly hold the spider against rotation on the pedestal. Such latching mechanism may comprise a toothed, gear-like member 15 surrounding and rigidly secured to hub portion 13, as by being keyed thereto, as at 16, and to co-act with this member 15 there may be mounted on the pedestal 7 one or more latch members 17, each of which is adapted to engage between any two teeth of the gear-like member 15, and whereby the seat is held against rotation on the pedestal with such force that it will not revolve as a result of the jarring or swaying of the vehicle from any position in which the chair is placed, yet permitting the chair to be turned by a person readily and easily into any desired position.

Referring to Figs. 4 and 5, each of the two latches shown is slidably mounted in a guide-way provided therefor in a horn-like projection 18 formed on the pedestal 7. Latch

members of various different designs may be used. However, in a preferred form the rear of each latch 17 is hollowed out, and in this recess there is seated a compression spring 19, the outer end of which is adapted to be received in a recess 20 of a cap member 21, which is removably threaded into the end of the projection 18. Spring 19 constantly urges the inner end 22 of the latch toward the gear member 15. The latch end 22 is bevelled on two sides, and the teeth 23 of gear 15 are correspondingly inclined. The co-action between the bevelled ends of the latches 17 and the gear-like member 15 is such that the seat will not revolve due to swaying movements of the vehicle. However, the construction is such that a person, by grasping the top of the back of the seat and giving it a quick turn, may revolve the chair into any desired position. Such operation on that part of the chair causes the teeth 23 of the member 15 to cam or wedge the latches 17 outwardly, and the latches will ride over the quickly moving teeth until the rotation of the seat ceases, whereupon the springs 19 will cause the latches 17 to move into full locking position between the adjacent teeth 23 with the member 15. The construction illustrated in Figs. 4 and 5 permits full revolution of the seat in either direction.

The gear-like member 15 is also provided with an annular bevel surface 24 which extends from the under surface of the member 15 to the roots of the teeth 23. This bevel surface 24 permits the spider 5 to be inserted into the pedestal 7 without requiring previous adjustment of the latches 17, since when the hub 8 is lowered into the sleeve 9 of the pedestal the bevelled surface 24 will cam the latches 17 outwardly and will permit movement of the spider into final position, whereupon the latches 17 will snap between the teeth of the member 15, and no further adjustment is necessary. There is preferably a removable pin 25 positioned in each pedestal projection 18 and which engages in a slot 26 provided in the latch 17 therein to prevent the latch from moving inwardly and outwardly to too great a distance and from falling out when the pedestal is removed.

Preferably the front edge of each latch 17 is convex as at 22', and the recesses between each two teeth 23 are of complementary shape, as clearly shown in Fig. 5. This concavo-convex vertical engagement between the latch ends and the recesses between the teeth 23 is such that the spider 5 and the parts supported thereby will be firmly retained on the pedestal, but may be vertically removed therefrom by lifting upwardly with sufficient force; but without more than the ordinary force the seat will not fall from the pedestal even though the vehicle in which the seat is mounted should turn over, as

might happen as a result of an accident or collision, or otherwise. This feature is a safety feature and is valuable to prevent injuries to passengers from loose chairs in the case of an accident or collision.

If it is desired to withdraw the latches 17 completely, in addition to removing the caps 21, it is necessary to remove the pins 25. To permit the ready removal of the caps 21 they may be provided with spanner holes 27 which, however, do not extend all the way through the caps. By this arrangement there is no opportunity for grease or other lubricants from running to the outside of the pedestal where it might soil passengers' clothing and be otherwise objectionable.

Referring to Figs. 6 and 7, the edges of the latches 17 may be straight, as at 28, instead of convex. A latch having this shape of end, however, does not serve to prevent or restrain the spider 5 from being lifted bodily from the pedestal. To prevent this the upper hub portion 8 may be provided with an annular peripheral groove 29, and a screw 30 may be adjustably mounted through the sleeve portion 9 of the pedestal, the screw end being adapted to engage within the recess 29 to prevent the spider 5 and the parts supported thereby from being removed from the pedestal 7. The screw 30 has preferably associated therewith a jam nut 31. To permit the spider 5 to be removed from the pedestal it is only necessary to adjust the screw 30 until it is withdrawn from the groove 29.

In the construction shown in Figs. 6 and 7 the spider 5 and the hub 8 are made in two parts which are secured together by suitable bolts 32. Also, suitable separate bearing members may be employed in the construction wherever desired. For instance, a ring 33 of suitable bearing material may be secured in the sleeve 9 to take the wear from the rotatable hub portion 8. Also suitable sleeves 34 of bearing material may be provided in the pedestal projections 18 to take the wear from the sliding latches 17. A bearing sleeve 35 may also be provided between the lower hub portion 13 and the lower sleeve portion 14. This construction with the various separate bearing members is preferable when an aluminum construction is desired. The upper portion of the spider and the pedestal may be made satisfactorily of aluminum but it is better to have the hub portions, the gear member 15 and the latches of harder material, such as steel or iron.

In order to prevent full rotation of the seat on the pedestal, plugs or screws 36, or the like, may be seated in suitable holes provided therefor in the hub portion 8 so that their heads will extend into the annular groove 29 and will strike against and be stopped by the end of the screw 30 which is disposed in this groove. This feature is valuable where it is desired to place a chair

so close to a wall or window that if the chair were permitted to have full rotation the back of the chair would strike against the wall or window. By the above means the turning of the chair can be so restricted that the back cannot be moved into contact with such wall or window. It will be obvious that this means enables considerable economizing of space. By placing the plugs 36 at different places in the groove 29 the rotation of the chair can be restricted to any desired scope.

Also, as shown in Figs. 8 and 9, instead of providing hollow latches, as described hereinbefore, the rear portions of the latches may be in the form of stems, such as 37, which slidably penetrate the cap members, such as 38, mounted in the ends of the pedestal projections 18. A compression spring 39 placed about each of these stems may serve to continually press the latches toward the gear member 15. Pins 40 penetrating the projections 18 and entering slots 41 in the heads 42 of these latches may be used to prevent too extensive outward movement of the latches, while a pin 43 mounted in the extreme outer ends of the stems 37 may serve to prevent the latches from falling inwardly of the pedestal when the spider and gear 15 have been removed therefrom.

Figs. 10 and 11 illustrate another method of permitting rotation of the chair in both directions but only to a limited extent in each direction. As shown, this is accomplished by substituting a special latch for one of the latches 37, and in connection therewith providing specially shaped gear teeth on the gear wheel 45. The special latch is shown at 44, and the special shape is given thereto by having the end portion which is adapted to engage between the teeth of the gear wheel presenting rather straight or square sides instead of gradually inclined or bevelled sides. The gear wheel 45 is provided with a special tooth 46 having a straight side 47 which, when it is brought against a straight side edge of the latch 44 by the rotation of the chair in one direction will not permit further rotation between the gear 45 and the special latch 44 in that direction, thus restricting the rotation of the chair. The gear wheel 45 has another special tooth 48 having a similar straight side 49 but presented in the opposite direction from the straight side 47 of the tooth 46. As the chair is rotated in the reverse direction this straight side 49 of the tooth 48 will come against the other straight side of the special latch 44 and will prevent further rotation of the chair in that direction.

In Figs. 12 and 13 there is illustrated a construction which permits rotation of the chair in one direction only. To this end each of the latches 50 have their inner ends 51 shaped to present a bevelled surface 52 on

one side and a straight or square surface 53 on the other side. The teeth of the gear wheel 54 are designed to have the spaces between them of corresponding shape to the shape of the ends 51 of the latches 50. Thus by reason of the bevelled surface engagement between one side of the latches 50 and the inclined sides of the teeth of the gear 54 the chair may be revolved in one direction, and by reason of the straight or square engagement between the other or straight sides of the latches and the other or straight sides of the gear wheel teeth, the chair may not be rotated in the reverse direction. By turning the gear-like member and the latches 50 upside down the chair may be conditioned to revolve in the reverse direction but not in the opposite direction.

Referring to Figs. 14, 15 and 16, instead of mounting the latches in the pedestal for engagement with a gear wheel secured to the spider for rotation therewith, the latches, such as 55, may be mounted in suitable projections 56 provided on the lower portion 57 of the spider 58. The upper portion of the pedestal 59 may be formed into a hub portion 60, and upon this hub 60 may be secured, as by key 61, the gear wheel 62 which is adapted to be engaged by the latches 55. The projections 56, the latches 55, the gear member 62 and the means for yieldingly pressing the latches into engagement with the gear member may assume any of the forms described above. Preferably the lower portion of the spider is formed into an annular sleeve portion 63 which seats snugly about a hub portion 64 formed on the pedestal. Also, the spider portion 57 and the pedestal portion 63 may have a bevelled surface bearing engagement, as at 65.

In this construction in order to prevent oil or other lubricants from flowing upon the outside of the pedestal 59, there is preferably in the pedestal an annular groove 66 which is disposed immediately below the sleeve portion 63 of the spider and is adapted to catch whatever oil may flow downwardly between the portions 63 and 64. A suitable number of holes 67 are provided to drain the oil from the groove 66 into the interior of the pedestal 59, which is hollow.

It will be readily apparent that in all modifications of the construction, the spring actuated latches on opposite sides of the chair hold the chair in any position in which it is placed, irrespective of the swaying movement of the vehicle, particularly in passing around sharp curves, while at the same time the chair can be turned readily and easily by a person into any desired position.

The bevelled bearing surface engagement between the fixed part of the chair and the revolving part serves to take up wear and to prevent the rocking or wobbling of the

chair top after the chair has been in use for some time. Although only one latch is essential, it is preferable to employ two latches in each of the constructions to make the locking doubly sure and to make the operation of the chair a little more smooth and precise. In addition, the double latch construction allows the chair to be revolved more easily by a person, and at the same time leaves it more rigidly set.

One of the advantages of the various chair constructions described above is that when a plurality of the chairs are placed in a vehicle they can all be set in the same relative position, thus giving the vehicle an orderly appearance without necessitating the use of a separate breaking mechanism, or other supplementary restraining devices.

Obviously the construction is not limited to any specific material. For instance, the base could be made of pressed steel and the other parts of various metals, such as cast steel, forged steel, etc. The gears and latches may be made of any suitable material, preferably such as will be conducive to long wear.

It will be noted that the hollow latch construction gives a longer bearing for the latch and permits a solid cap to be screwed in over the latch end. A solid cap will keep dust and dirt out of the mechanism, and also will confine grease and oil within the pedestal.

Attention is called to the fact that the location of the latches on the spider as shown in Figs. 14, 15, and 16, instead of on the pedestal, brings the latches and their projections more closely under the seat and more out of sight. The projections or the other constructions, however, are not at all objectionable nor unsightly.

As many changes could be made in the above construction and as many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What we claim is:—

1. In a chair of the character described, in combination, two chair elements, one rotatably supporting the other, a gear-like member on one of said elements, and a spring-pressed latch on the other element, said latch engaging endwise between the teeth of said gear-like member, whereby relative rotative movement between the said elements is yieldingly restrained, said latch having a convex outer extremity, and said gear-like member having complementary shaped surfaces between its teeth to receive said latch extremity, whereby, when said latch extrem-

ity is seated between the teeth of said gear-like member, separation between the said two elements is prevented in a direction perpendicular to the plane of rotation of the chair.

2. In a chair of the character described, in combination, two chair elements, one rotatably supporting the other, a gear-like member secured to one of said elements, and a latch secured to the other of said elements and engaging endwise between the teeth of said gear-like member, means acting on said latch to yieldingly maintain said latch in engagement with said gear-like member to yieldingly restrain relative rotation between said elements, and means, comprising an annular bevelled surface on said gear-like member extending from one face thereof to the roots of its teeth, for camming said latch outwardly into position between said teeth when said gear-like member is moved axially across the end of said latch.

3. In a chair of the character described, in combination, two relatively rotatable chair elements, one supporting the other, latch mechanism associated with said elements and yieldingly restraining relative movement therebetween, said mechanism including a gear-like member on one of said elements, and a latch on the other of said elements, said latch having a tooth-like end adapted to engage endwise between the teeth of said gear-like member, said latch having a tubular rear portion, a projection in which said latch is slidably mounted, a cap removably seated in said projection beyond the rear end of said latch, a spring seated against said cap and against said latch for yieldingly pressing said latch inwardly of said projection, an inwardly directed shoulder on the latch, and a pin on the projection coacting with said shoulder to limit inward movement of the latch.

4. In a chair of the character described, in combination, two relatively rotatable chair elements, one supporting the other, latch mechanism associated with said elements and yieldingly restraining relative movement therebetween, said mechanism including a gear-like member on one of said elements, and a latch on the other of said elements, said latch having a tooth-like end adapted to engage endwise between the teeth of said gear-like member, and means, acting on said latch, yieldingly maintaining said latch end in engagement between the teeth of said gear-like member, a hub on one of the chair elements, the other chair element having a sleeve portion surrounding and rotatably supporting said hub portion, an annular peripheral groove in said hub portion within said sleeve, a screw adjustably secured to said sleeve portion and extending into said groove, whereby said hub is pre-

vented from being lifted out of said sleeve while said screw is in said groove, said screw being adjustable to be withdrawn from said groove to permit said hub to be removed 5 from said sleeve, and a plug member secured to said hub and having a portion extending into said groove and adapted, when said chair is rotated, to engage against said screw, whereby the rotation of said chair is restricted. 10

This specification signed this 31st day of March, 1924.

RAYMOND F. STUBBLEBINE.
JOSEPH V. DOLAN.