March 17, 1931. M. T. VANDERVOORT 1,797,201

CHAIR CONSTRUCTION

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Fig. 1.

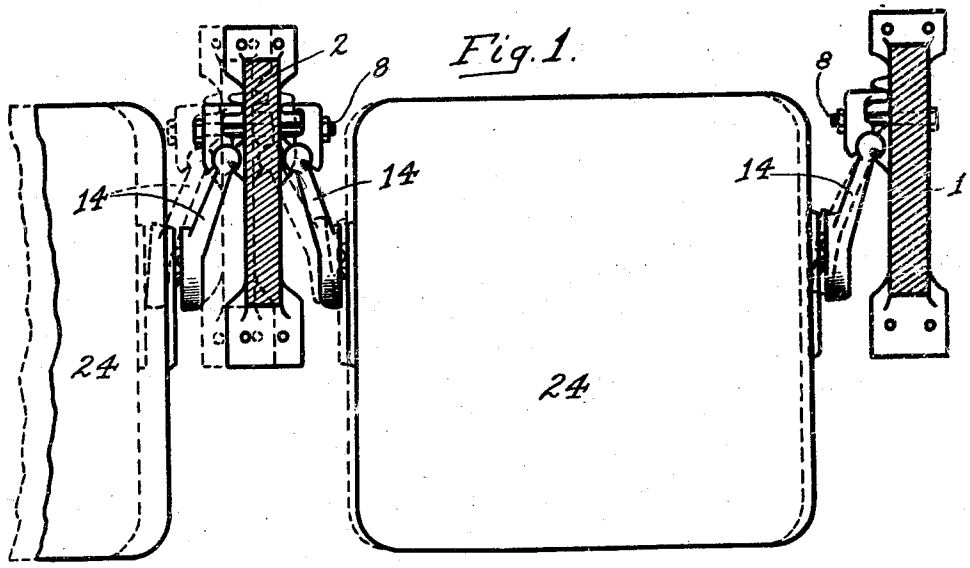


Fig. 2.

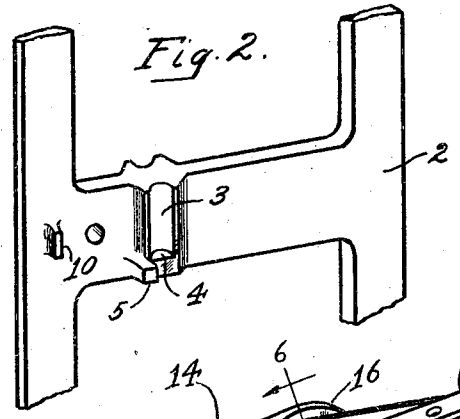


Fig. 3.

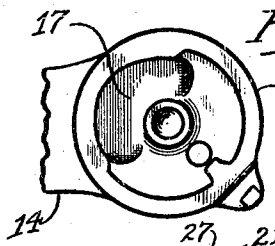


Fig. 4

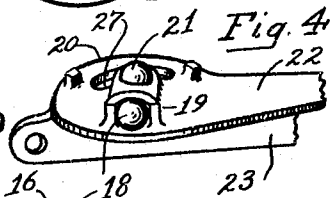


Fig. 5

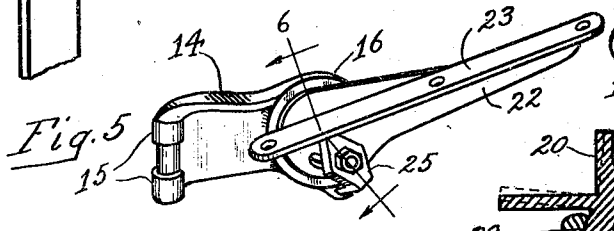


Fig. 6.

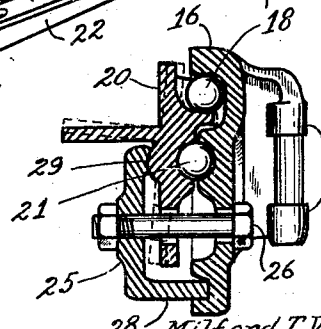
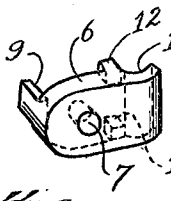


Fig. 7



Witness:
H. E. Radding

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CHAIR CONSTRUCTION

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Fig. 8.

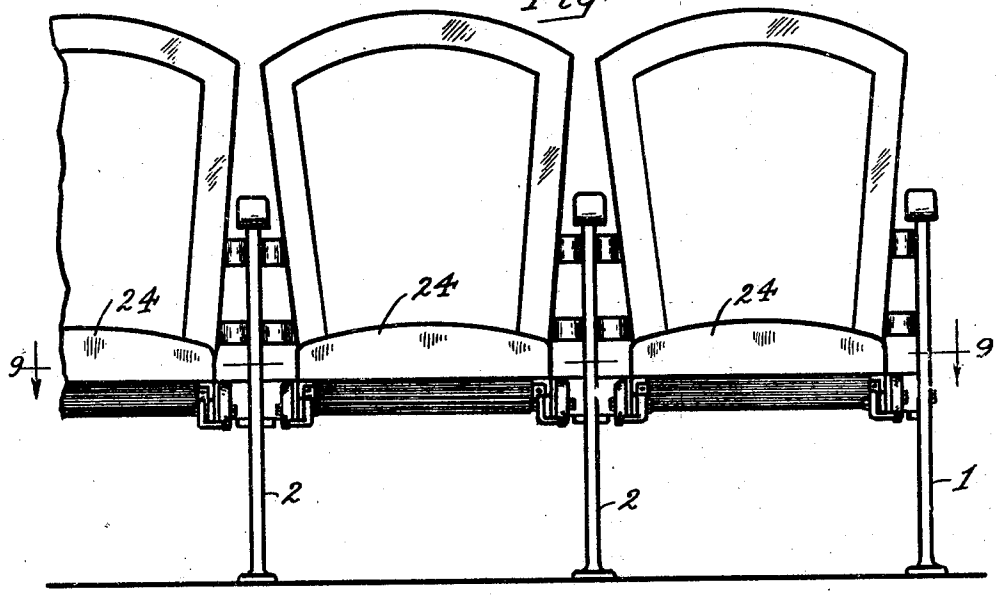
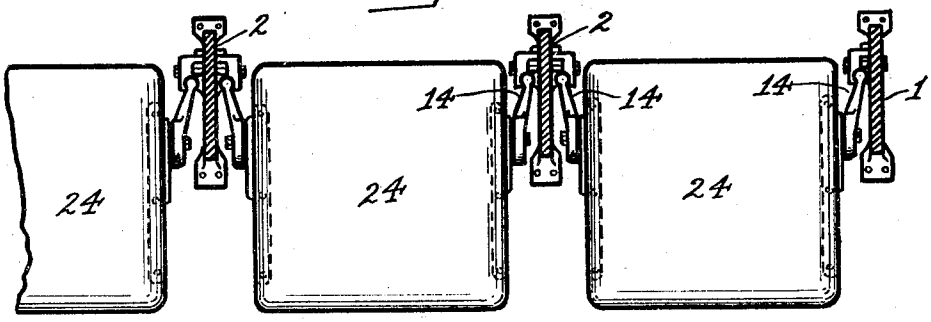


Fig. 9



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Witness:
G. E. Redding

Patented Mar. 17, 1931

1,797,201

UNITED STATES PATENT OFFICE

MILFORD T. VANDERVOORT, OF GRAND RAPIDS, MICHIGAN, ASSIGNOR TO AMERICAN SEATING COMPANY, OF GRAND RAPIDS, MICHIGAN, A CORPORATION OF NEW JERSEY

CHAIR CONSTRUCTION

Application filed April 23, 1928. Serial No. 272,070.

This invention relates to chair seat construction, particularly for theatres and the like.

The main objects of this invention are to provide an improved construction which will compensate for slight variations in positioning of the chair end standards; to provide a construction in which the chair end standards may be first installed and then the seats readily and quickly assembled therein; to provide a construction which will permit variations in the distance between standards so that different rows of seats, each having the same number of chairs, may be spaced to occupy increasingly wider floor spaces formed by converging aisles; to provide a construction in which the seat members may be readily removed for repair or replacement; to provide a construction in which greater clearance is secured between the lower edge of the seat when in raised position than has heretofore been the case; and to provide an improved pivotal hinge for the seat members which will permit limited universal movement and free pivotal movement under variable conditions.

An illustrative embodiment of this invention is shown in the accompanying drawings, in which:

Fig. 1 is a top plan view of one seat and a fragmentary portion of another, supported by means of my improved mounting, a changed position being shown in dotted outline;

Fig. 2 is an enlarged fragmentary view in perspective of that part of the chair end supporting standard at which the seat mounting is attached;

Fig. 3 is an enlarged fragmentary view in face elevation of one member of the pivot hinge;

Fig. 4 is an enlarged fragmentary view in perspective of the other member of the pivot hinge;

Fig. 5 is an enlarged view in perspective of the two pivot hinge members in assembled relationship;

Fig. 6 is a sectional view taken on the line 6—6 of Fig. 5;

Fig. 7 is an enlarged view in perspective of the mounting clip which is secured to the chair supporting standard;

Fig. 8 is a view in front elevation of a series of theatre seats equipped with my improved seat mountings;

Fig. 9 is a sectional view taken on the line 9—9 of Fig. 8.

Heretofore in the installing of theatre seats and the like, the positioning of the seat standards required a great amount of care and particularity. Unevenness in the floor would often cause the pivotal seat hinge joint to bind when the seat was raised. With constructions heretofore used it has also been impossible to vary the distances between seat supporting standards so that in placing seats in spaces formed by converging aisles, the outside seats could not be arranged in a line parallel to the aisle.

Another difficulty that has been encountered is in the removing of a chair seat for repair or replacement. This has been especially difficult on account of the interfitting and interlocking seat hinge joints.

All of the heretofore mentioned objections to the constructions at present in use, and many other unsatisfactory features not enumerated, have been overcome in my present invention.

In the construction shown in the drawings, a chair seat supporting end standard 1 and middle standard 2 are each shown with the inner faces thereof provided with a vertically disposed semi-cylindrical recess 3 open at its upper end and closed at its lower end by a flange 4. As shown particularly in Fig. 2, the standard is provided with an integrally formed projecting boss 5 located closely adjacent the lower end of the recess 3, for supporting the front end of a mounting clip 6 (Fig. 7), the rear end of which is provided with a hole 7 through which a bolt 8 is placed to secure the clip to the standard 2. The extreme rear end of the clip 6 is provided with a leg 9 protruding from the inner face thereof which rests on the chair standard and at the same time abuts against a projecting integrally formed boss 10 on the standard 2.

The forward end of the clip 6 is also provided with a vertically disposed semi-cylin-

drical recess 11 for cooperating with the recess 3 to form a cylindrical socket or bracket bearing having a vertical axis. Immediately back of the recess 11, the inner face of the clip 6 is provided with protruding legs 12 and 13 located at the top and bottom respectively of the clip, the lower leg 13 being positioned to rest upon the boss 5 of the standard 2, for preventing the clip from rotating out of registry when the bolt 8 is loosened.

The clips for both the supporting standards 1 and 2 are of the same construction except that they are made in rights and lefts for use on the right and left sides of the seats.

The seat supporting brackets are also of identical construction except that they are in rights and lefts, so a description of one only will be given.

Referring particularly to Figs. 5 and 6 of the drawings, a seat supporting bracket 14 is provided at one end with a vertically disposed trunnion 15 which is adapted to be embraced in the heretofore mentioned cylindrical socket. This construction permits the bracket 14 to have a limited horizontal swinging movement relative to its supporting standard.

The other end of the bracket 14 is in the form of a flat annular head 16 and the inner face of the head is provided with a shallow crescent shaped recess 17 for receiving a steel ball 18, which is carried in a semi-cylindrical socket 19 formed on the inner face of a seat bracket head 20. The inner faces of the heads 16 and 20 are provided at the centers thereof with semi-spherical recesses for embracing a steel pivot ball 21.

The outer circumferential wall of the recess 17 is drawn in on a shorter radius at each end of the recess so as to bind the ball 18 after a certain amount of relative pivotal movement between the heads 16 and 20, to secure a noiseless seat hinge in much the same manner as is secured by the construction shown in the Cogger Patent No. 683,439, issued Oct. 1, 1901 to The American School Furniture Company, predecessors of my assignee herein.

The bracket head 20 carries an arm 22 having a flange 23 which is attached to the under side of a seat 24 along the side marginal edges thereof.

Means are provided for holding the heads 16 and 20 in assembled relationship and to freely permit relative pivotal movement therebetween when the heads are not in parallel planes. Such means comprise an angle clip 25 secured to the head 16 by a bolt 26 which passes through an arc shaped slot 27 formed in the head 20. The relatively short transverse arm 28 of the angle clip has its end embraced in a socket formed in the adjacent face of the head 16. The main arm of the clip 25 has a concave face on the inner side at the end thereof which slidably bears against a semi-spherical boss 29 formed on the outer face of the head 20. The curvature of the boss 29 is formed by a radius whose center point is the center of the pivot ball 21. The ball 21 normally holds the heads 16 and 20 in spaced relationship when the heads are in parallel planes, thus permitting a limited universal or rocking movement therebetween.

In the operation and use of this construction, the chair supporting standards 1 and 2 are positioned and secured to the floor, either in a straight line as shown or on an arc as is usual in theatres and the like.

The nuts on the bolts 8 being loosened so as not to bind the clips 6, the seats 24 having the bracket arms 14 assembled thereon, are then assembled to the standards by merely slipping the trunnions 15 into the cylindrical sockets formed by the surfaces 3 and 11 in much the same manner that bed rails are assembled to the head and foot frames.

The limited rocking or universal movement of the bracket arm at its point of pivotal connection to the seat member, permits the outer trunnion ends of the bracket arms 14 to be shifted horizontally to compensate for variations in the spacing of the standards and for variations due to an uneven floor.

When the lower ends of the trunnions 15 rest upon the flanges 4, the seat is in place and the nuts on the bolts 8 are then drawn up snugly, causing the clip 6 to tightly grip the trunnions 15 of the bracket arms 14.

The seat 24 may be raised or lowered freely on its pivotal hinge and as it approaches its upper or lower limit, the ball 18 binds against the inwardly drawn cam surfaces of the recess 17, so as to stop and limit the pivotal movement without abruptness or noise.

In case it is desired to repair or replace a seat, the nuts on the bolts 8 are loosened. The flanges 4 prevent the trunnions 15 from passing on out through the bottom of the cylindrical slots. The seat 24 is then grasped by both hands and lifted upwardly until the trunnions are free from their sockets.

Although but one specific embodiment of this invention has been herein shown and described, it will be understood that numerous details of the construction shown may be altered or omitted without departing from the spirit of this invention as defined by the following claims.

I claim:

1. In a device of the class described the combination of side frames, clips secured to said side frames, said clips and frames being formed to provide sockets, interengaging parts on said clips and frames to maintain said clips in an operative relation with respect to their respective frames when loosely secured thereto, bracket arms having trunnions on one end thereof adapted to fit in said

sockets so as to permit limited horizontal swinging of the other ends of said arms, and a seat supported on the swingable ends of said bracket arms.

2. A seat structure comprising a pair of side frames provided with vertical bearing sockets open at the top and closed at the bottom, a seat, approximately horizontal bracket arms extending along the side edges of the seat at the rear portion thereof and having vertical trunnions arranged in said sockets and inserted through the open tops thereof, said trunnions permitting the arms to swing horizontally, and universal joints connecting the front ends of the arms with the seat at the sides thereof and permitting the latter to raise and lower and also to swing horizontally in adjusting the seat.

3. A seat structure comprising a pair of side frames provided with vertical bearing sockets open at the top and closed at the bottom, a seat, approximately horizontal bracket arms extending along the side edges of the seat at the rear portion thereof and having vertical trunnions arranged in said sockets and inserted through the open tops thereof, said trunnions permitting the arms to swing horizontally, said sockets having means for laterally clamping the trunnions of the arms in the sockets, and universal joints connecting the front ends of the arms with the seats at the sides thereof and permitting the seat to raise and lower and also to swing horizontally in adjusting the seat.

4. A seat structure comprising a pair of side frames provided with vertical bearing sockets open at the top and closed at the bottom, a seat, approximately horizontal bracket arms extending along the side edges of the seat at the rear portion thereof and having vertical trunnions arranged in said sockets and inserted through the open tops thereof, said trunnions permitting the arms to swing horizontally, said sockets having clip plates and clamping bolts to clamp the trunnions laterally in the said sockets, interengaging means on the clip plates and the side frames for holding the clip plates against rotary movement, and universal joints connecting the front ends of the arms with the seats at the side edges thereof and permitting the seats to raise and lower and also to swing horizontally in adjusting the seats.

5. A seat structure comprising a pair of side frames provided with vertical bearing sockets open at the top and closed at the bottom, a seat, approximately horizontal bracket arms extending along the side edges of the seat at the rear portion thereof and having vertical trunnions arranged in said sockets and inserted through the open tops thereof, said trunnions permitting the arms to swing horizontally, said bracket arms being provided at the inner faces of their front ends with ball sockets and curved ball races concentric with the sockets, and the said seat having in its sides ball sockets and ball races registering with the sockets and races of the bracket arms, balls in the registering sockets, and balls in the registering races, said balls permitting the seat to raise and lower and to swing horizontally in adjusting the seat.

In testimony whereof I have hereunto set my hand at Grand Rapids, Michigan, this 18th day of April, 1928.

MILFORD T. VANDERVOORT.