No. 619,154. Patented Feb. 7, 1899.

J. J. EGAN & A. E. HOOK.

DISAPPEARING CHAIR.

(Application filed June 3, 1898.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

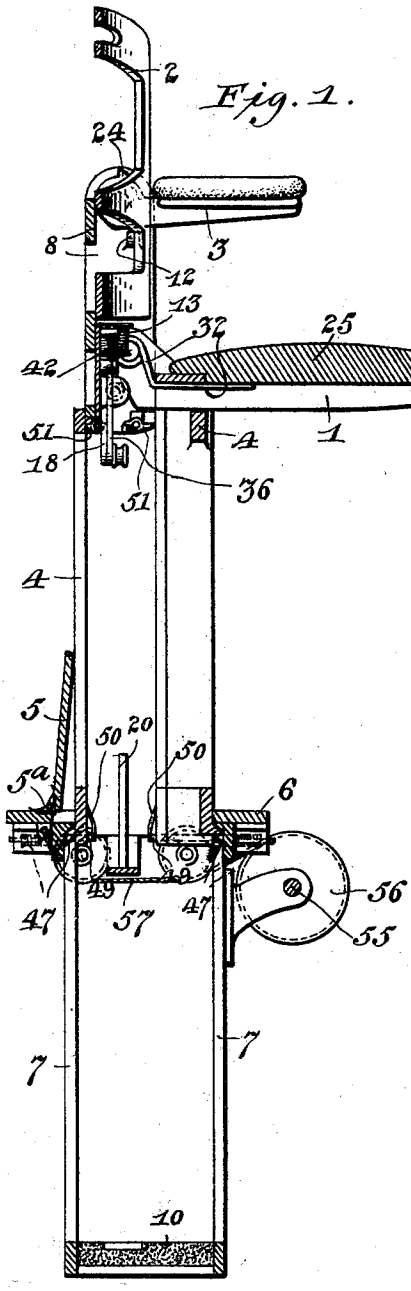
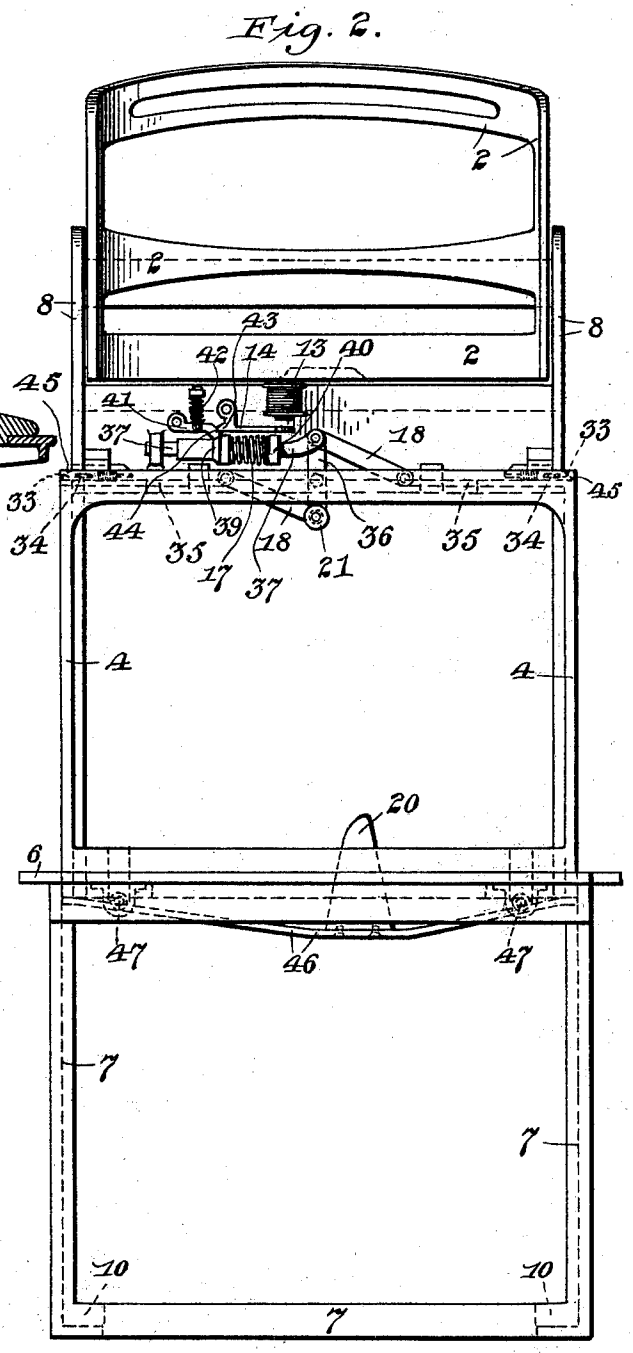


Fig. 2.



WITNESSES

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Fig. 3.

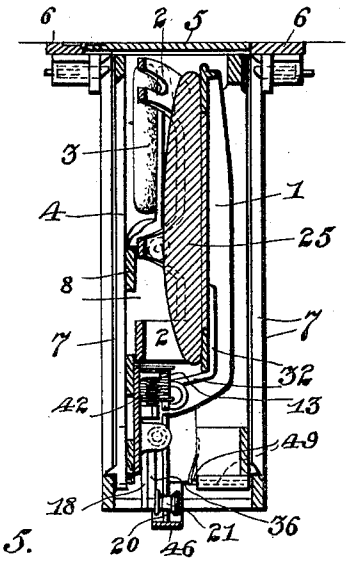


Fig. 4

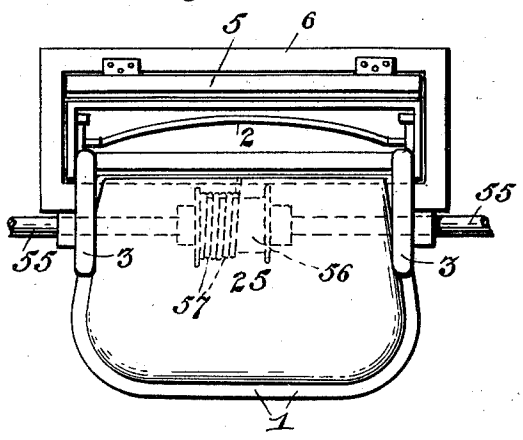


Fig. 5.

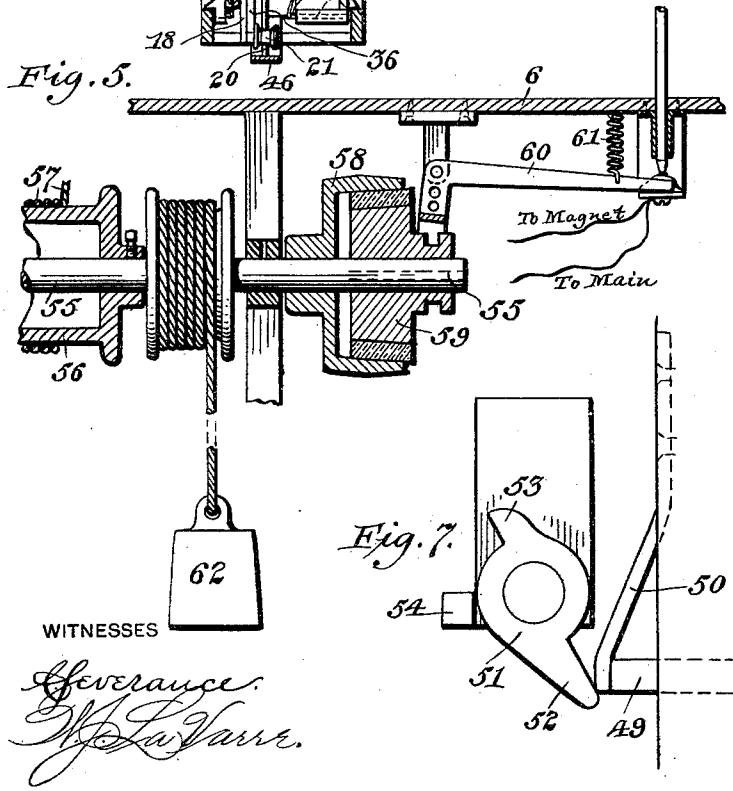


Fig. 6.

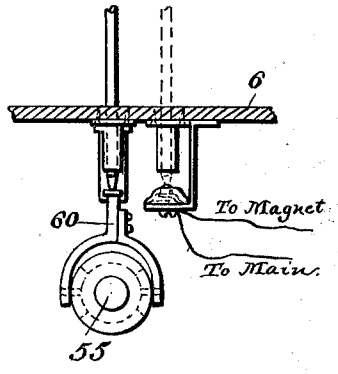


Fig. 7.

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UNITED STATES PATENT OFFICE.

JAMES J. EGAN AND ALEXANDER E. HOOK, OF BUTTE, MONTANA.

DISAPPEARING CHAIR.

SPECIFICATION forming part of Letters Patent No. 619,154, dated February 7, 1899.

Application filed June 3, 1898. Serial No. 682,470. (No model.)

To all whom it may concern:

Be it known that we, JAMES J. EGAN and ALEXANDER E. HOOK, citizens of the United States, residing at Butte, in the county of Silver Bow and State of Montana, have invented certain new and useful Improvements in Disappearing Chairs; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to improvements in chairs or seats, and particularly to that class of chairs or seats which are adapted to disappear or be entirely removed from the surface of a floor.

It consists in providing a chair or seat with a sliding frame, a folding seat, and a telescoping back, the construction being such that the whole chair will drop below the surface of a floor.

It also consists in providing a chair having a sliding frame and a telescoping back with means for controlling the same, whereby they may be raised or lowered at pleasure.

It also consists in certain other novel constructions, combinations, and arrangements of parts, as will be hereinafter described and claimed.

In the accompanying drawings, Figure 1 represents a vertical central section through a chair embodying our invention. Fig. 2 represents a front elevation of the same. Fig. 3 represents a vertical section through the chair when in its folded position beneath the floor. Fig. 4 represents a top plan view of the seat. Fig. 5 represents a detail sectional view illustrating the manner of throwing the operating mechanism into and out of engagement. Fig. 6 represents a detail view showing the push-button and the clutch-operating mechanism, and Fig. 7 is a detail view showing the tripping mechanism for operating the bolt-pusher.

1 in the drawings represents the seat-frame; 2, the back of the chair; 3, the arm-supports; 4, the sliding frame of the chair; 5, a trap-door, and 6 the floor-surface.

In constructing a disappearing chair the whole frame may be dropped to a position below the floor-line; but in adapting such chairs to the floors of galleries in buildings it is necessary to have the folded chair occupy as little space as possible, so as not to render it necessary to build the floors of the galleries any thicker than usual.

The object of the present invention is to provide a chair which can be used between the floor and the ceiling of an ordinary gallery. For this purpose the upper part of the chair is made to telescope into the lower part thereof, so as to shorten the height of the chair one-half.

In carrying out this invention the sliding seat-frame 4 is adapted to move in a frame 7, secured to the under side of the floor just below the trap-door. This frame is made of suitable depth to receive the chair below the floor and is provided at its lower ends with rubber bumpers or buffers, as 10, upon which the chair may fall without producing unnecessary jar or noise. The trap-door 5 fits snugly in the opening in the floor and is normally held with a tendency to close by means of springs, as 5^a. The frame 4 of the chair is adapted to receive an upper frame, as 8, which carries the back, seat, and arms, together with a tripping mechanism. The frame 8 is adapted to slide completely within the frame 4 and has pivoted to it the seat-frame 1, which may be provided with the usual cushion 25. The seat is normally held in its uppermost or folded position by means of strong springs, as 32. The seat is thus always folded and ready for the descent of the chair when it is not being occupied. The seat-frame when it is folded up is adapted to engage the arm-rests 3, which are pivoted in the upper end of the frame 8 and raise them into their folded positions, as seen in Fig. 3 of the drawings. A limiting-lug, as 12, formed on each side of the frame 8, supports the arms in their lowered positions, while a lug 24, formed upon the said arms, engages a cross-slat in the frame 8 to limit the arm in its upward movement. The back 2 of the chair is preferably pivoted between the sides of the frame 8. In order to support the frame 8 in its raised position in the frame 4, spring latches or bolts, as 33, are mounted in the lower end of the frame 8, the said bolts being limited in their movement by means of a pin-and-slot connection, as at 34. The bolts 33 are connected by bars or rods 35 with links

18, the said links 18 being also connected or pivotally secured to a lever, as 36 36. To one end of the lever 36 a spring-actuated bolt, as 37, is secured, the other end of the said bolt finding a bearing in a lug, as 38, formed upon the back of the frame 8. An engaging head, as 39, is also secured upon the bolt 37, and a spring 17 is interposed between the said head and a lug, as 40, also secured to the back of the frame 8. This spring normally tends to force the head 39 away from the lug 40 and would tend to draw the bolts 33 inwardly. A latch, as 41, pivoted to the frame 8, engages with its opposite end a shoulder formed upon the head 39, as clearly seen in Fig. 2 of the drawings, the latch being normally held in its depressed position by means of a spring 42, the said spring 42 of course being weaker than the spring 17. An armature, as 14, is also pivoted to the frame 8 and is provided with a nose, as 43, which is adapted to engage a notch 44, formed in the end of the latch 40. The other end of the armature 14 is arranged opposite an electromagnet 13, suitably supported upon the frame 8. When the parts are in position, as shown in Fig. 2 of the drawings, the latches 32 engage recesses, as at 45, in the lower frame 4, and the upper portion of the frame is supported in the lower portion, the armature 14 operating to lock the parts in this position. When a current is passed through the coil 13, so as to magnetize the magnets, the armature 14 will be attracted toward the same, releasing the latch 40 and permitting the spring 17 to force the head 34 past the said latch and withdraw the bolts 33, whereupon the upper portion of the frame will be allowed to drop into the frame 4. In order to set the mechanism again, as shown in Fig. 2 of the drawings, a wedge, as 20, is supported by a suspension-bar, as 46, upon the lower end of the frame 4. This wedge is adapted to engage a roller 21, secured upon the lower end of the lever 36, so that when the upper part of the chair drops into the frame 4 the roller engaging the said wedge will operate the bolt 37 against the action of the spring 17 and permit the latch 40 and the armature 14 to assume their holding positions once more. When the frame 8 and the back 2 are lifted out of the frame 4, the springs engaging the bolts 33 permit them to snap into position again in engagement with the notches 45 to hold the said frame in its raised position. In order to hold the frame 4 in its uppermost position, spring-latches, as 47, are mounted in suitable casings just below the floor 6 and normally project so as to engage lugs, as 48, formed on the lower part of the frame 4. In forcing the push-bolts 49 to one side, the said bolts engaging the noses of the latches 47 and forcing them back out of the way. Thus the whole chair is permitted to drop into the frame 7, the trap-door 5 closing over the same as it disappears beneath the floor.

While the frame 8 might be relied upon to force back the springs 50, yet I prefer to use tripping-dogs, as 51, which are pivoted to the lower end of the frame 8 and are provided with engaging noses, as 52. Each one of the said dogs is provided with a lug, as 53, which is adapted to engage a projection, as 54, upon the chair-frame. By this construction it will be seen that as the chair-frame descends the dog 51 will be prevented from swinging upon its pivotal point by means of the lug 53 engaging the projection 54, so that the nose 52 will operate to force the push-bolts 49 laterally. When the chair rises again, the dogs 51 will be free to swing upon their pivotal points, as shown in Fig. 7 of the drawings, so as to pass the springs 50 without affecting them. The passing of a current through the magnet 13 may be provided for in any usual and well-known manner, and a press-button located in any part of the house may be used to complete the circuit when it is desired to drop one or more chairs that may be in the house. In order to raise the chair or chairs again, a power-shaft, as 55, may be mounted below the floor and provided with a drum, as 56, opposite each chair. The shaft 55 may be used to operate a whole row of chairs, if desired, being extended along beneath the floor for the required distance and provided with the drums 56 opposite each chair. A suitable cable, as 57, may be secured at one end to the under side of the floor to one side of the chair-frame, passing beneath pulleys, as 57^a, mounted in bearings in the bottom of the said frame, and at the other end to the drum 56, so that when the shaft 55 is revolved the cable will be wound upon the drum and the chair-frame raised.

Any suitable power may be applied to the shaft 55, a suitable means for applying the power being illustrated in Fig. 5 of the drawings, in which a pulley, as 58, is loosely mounted upon the shaft 55 and adapted to receive upon its inner face a friction-clutch, as 59. The friction-clutch 59 is preferably splined upon the shaft 55, so that it is capable of longitudinal movement thereon, but carries the shaft with it when it is revolved. A suitable operating-lever, as 60, may be pivoted upon the under side of the floor for moving the clutch back and forth, the outer end of said lever being held normally in its upper posi-

end of the lever 60 to force the said lever downwardly and bring the clutch 59 into engagement with the pulley 58 when it is desired to impart movement to the shaft 55.

It will be seen from the drawings, especially in Fig. 1, that when the seat 1 is down and the weight of the person is upon the same it will rest upon the front cross-bar of the sliding frame 4, which will act as a fulcrum to the frame, and the weight of the person upon the seat will operate to hold the telescoping portion of the frame still more securely in its upper position. It will also be seen from this construction that no matter if the upper part of the frame is tripped by the electrical apparatus the seat cannot descend when occupied by a person on account of the disposition of the weight upon the seat with respect to the front supporting-bar of the frame beneath it, and the lower part of the frame cannot drop until released by the descent of the upper telescoping part. This is an important feature of our invention, and it enables us to lower all the seats in a row except those occupied, if desired, and it prevents the possibility of a seat being dropped while a person is sitting thereon.

When it is desired to drop the seats, a whole row of seats may be operated by means of a push-button located opposite the end of the row, as seen in Fig. 6 of the drawings, it merely being necessary to use a stick which can pass through a suitable opening in the floor to engage the said push-button. It will be apparent that the seats may be raised or lowered, as desired, by merely inserting the stick into one or the other of the holes in the floor. The shaft 55 is preferably caused to unwind after it has raised the chairs by means of a weight 62, attached thereto at any suitable point. This causes all of the cables to be loose, so that any chair so lowered need not have to revolve the whole length of the shaft 55 to descend. When the shaft 55 has been operated to raise a chair or chairs, it lifts the sliding frame 4, and any one may then raise the back of the frame 8 into its upper position, so as to occupy the same, or an attendant may raise the backs of all of the chairs.

It will be readily seen from the above description that a seat of this character is especially well adapted for public houses and places for receiving large audiences and that it possesses many advantages over the seats now in use. In the case of a fire or a panic all the seats in the house may be lowered in an instant by pressing upon a push-button, and the seats thus be removed entirely from the way of those trying to get out of the house. So, also, this lowering of the seats below the floor will be found of great convenience in the cleaning and repairing of large houses. The seats can be lowered at any time, and the trap-doors closing snugly over the same will protect them from dirt and water. It will be also evident that a single seat or a single row of seats might be lowered at any time and raised again when desired.

Having described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a disappearing chair, the combination with a sliding frame, of an upper frame adapted to telescope therein, and means for raising and lowering the said telescoping frame above and below a floor-surface, substantially as described.

2. In a disappearing chair, the combination with a sliding frame, of a telescoping frame adapted to slide therein, a seat pivoted to the said telescoping frame, and a back mounted thereon, and means for raising and lowering the frame with respect to a floor-surface, substantially as described.

3. In a disappearing chair, the combination with a sliding frame, of an upper frame adapted to telescope therein, a pivoted seat mounted upon the said upper frame and pivoted arm-rests also mounted thereon, a back secured to the said upper frame, and means for tripping the upper frame so as to permit the whole structure to drop below a floor-surface, substantially as described.

4. In a disappearing chair, the combination with a sliding frame, of a second frame adapted to receive the sliding frame beneath a floor, a telescoping upper portion adapted to telescope into the sliding frame, a movable support for the telescoping portion, means for withdrawing said support, a support for the sliding frame which support is adapted to be automatically released by the descent of the telescoping portion, and an automatically-acting trap-door which closes the opening through which the chair descends, the construction being such that when the upper frame is telescoped into the sliding frame, the whole will descend into the lower frame and be closed by means of a trap-door, substantially as described.

5. In a disappearing chair, the combination with a guide-frame, of a sliding frame mounted thereon, pivoted latches adapted to support the sliding frame in the upper part of the guide-frame, and a telescoping frame adapted to move in the sliding frame, which, in descending, automatically releases the pivoted latches which support the sliding frame, substantially as described.

6. In a disappearing chair, the combination with a guide-frame, of a sliding frame adapted to be supported therein, a telescoping portion mounted in the sliding frame and carrying a back, seat and arms, bolts for supporting the telescoping portion in the upper portion of the sliding frame, bolts for supporting the sliding frame, which bolts are automatically withdrawn by the telescoping portion as it descends, a tripping mechanism mounted upon the said upper portion, and means for operating the same whereby the whole structure may be lowered beneath the floor, substantially as described.

7. In a disappearing chair, the combination with a guiding-frame and a sliding frame, of a telescoping portion mounted in said sliding frame, bolts for holding the same in its upper position, a lever for operating the said bolts, a spring-bolt connected to said lever, and a latch for controlling the said spring-bolt, and means for controlling the said latch, substantially as described.

8. In a disappearing chair, the combination with a guide-frame, of a sliding frame adapted to move therein, an upper telescoping portion mounted in the sliding frame, bolts for holding the telescoping portion in its upper position, a lever connected with said bolts, a spring-bolt connected with said lever, a spring-actuated latch for engaging the said bolt, an armature for locking the said latch, and a magnet for controlling the armature, the construction being such that when the current is passed through the magnet, the armature will be turned toward the same so as to release the bolt mechanism and permit the upper portion of the chair to telescope in the lower portion, substantially as described.

9. In a disappearing chair, the combination with a guide-frame and a sliding frame, of a telescoping portion mounted therein, bolts for supporting the same, an electrically-operated means for controlling the said bolts, means for setting the said bolt mechanism comprising a wedge mounted in the bottom of the slide-frame, and a lever carrying an antifriction-roller mounted upon the said telescoping portion, the construction being such that when the telescoping portion drops into the sliding frame, the wedge will operate the antifriction-roller so as to set the supporting-bolts, substantially as described.

10. In a disappearing chair, the combination with a guide-frame and a sliding frame, of a telescoping portion mounted therein, a seat pivoted to the said telescoping portion and springs for normally holding the seat in its folded position, substantially as described.

11. In a disappearing chair, the combination with a sliding frame, of a telescoping frame adapted to move therein, bolts for supporting the sliding frame in its upper position, push-bolts for engaging the said bolts to release them, and dogs mounted upon the telescoping portion, the said dogs being so constructed as to push the push-bolts back as the telescoping portion descends but not to disturb the same when the chair is raised again, substantially as described.

12. In a disappearing chair, the combination with a sliding frame, of a telescoping frame adapted to move therein, a seat pivoted to said telescoping frame, and a cross-bar upon which the seat rests when in its lowered position, substantially as described.

In testimony whereof we hereunto affix our signatures in presence of two witnesses.

JAMES J. EGAN.
ALEXANDER E. HOOK.

Witnesses:
T. P. NEWTON,
JOHN TOWERS.