

L. GUDGELL.
 TRACK LAYING MACHINE.
 APPLICATION FILED AUG. 18, 1911.

1,045,397.

Patented Nov. 26, 1912.

3 SHEETS—SHEET 2.

FIG. 2

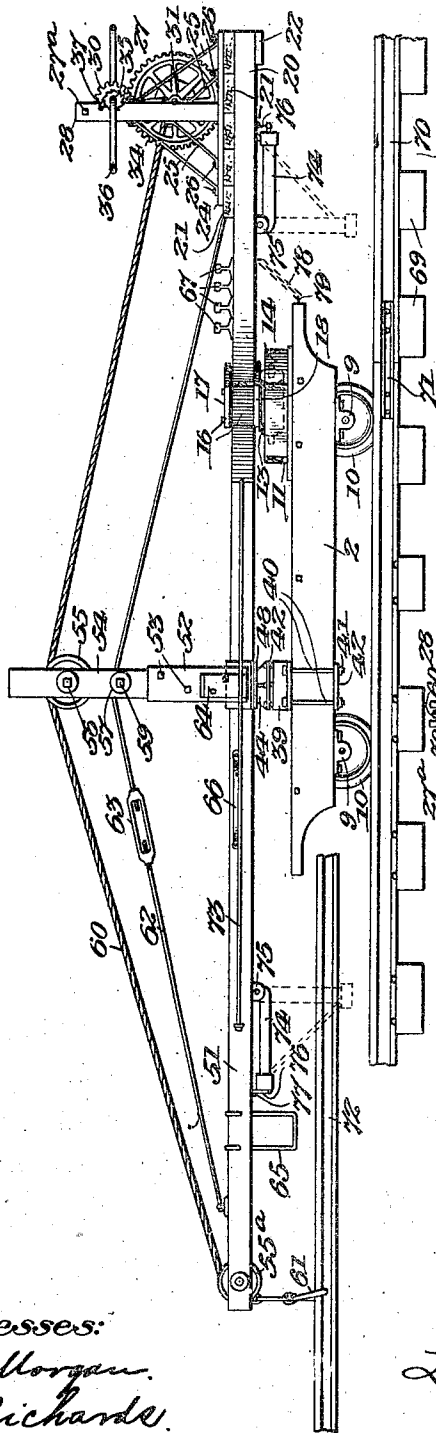
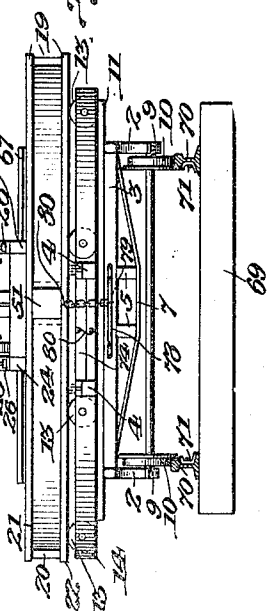


FIG. 3



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STAGE.

APPLICATION FILED MAY 28, 1910.

Patented Nov. 26, 1912.

5 SHEETS—SHEET 2.

1,045,398.

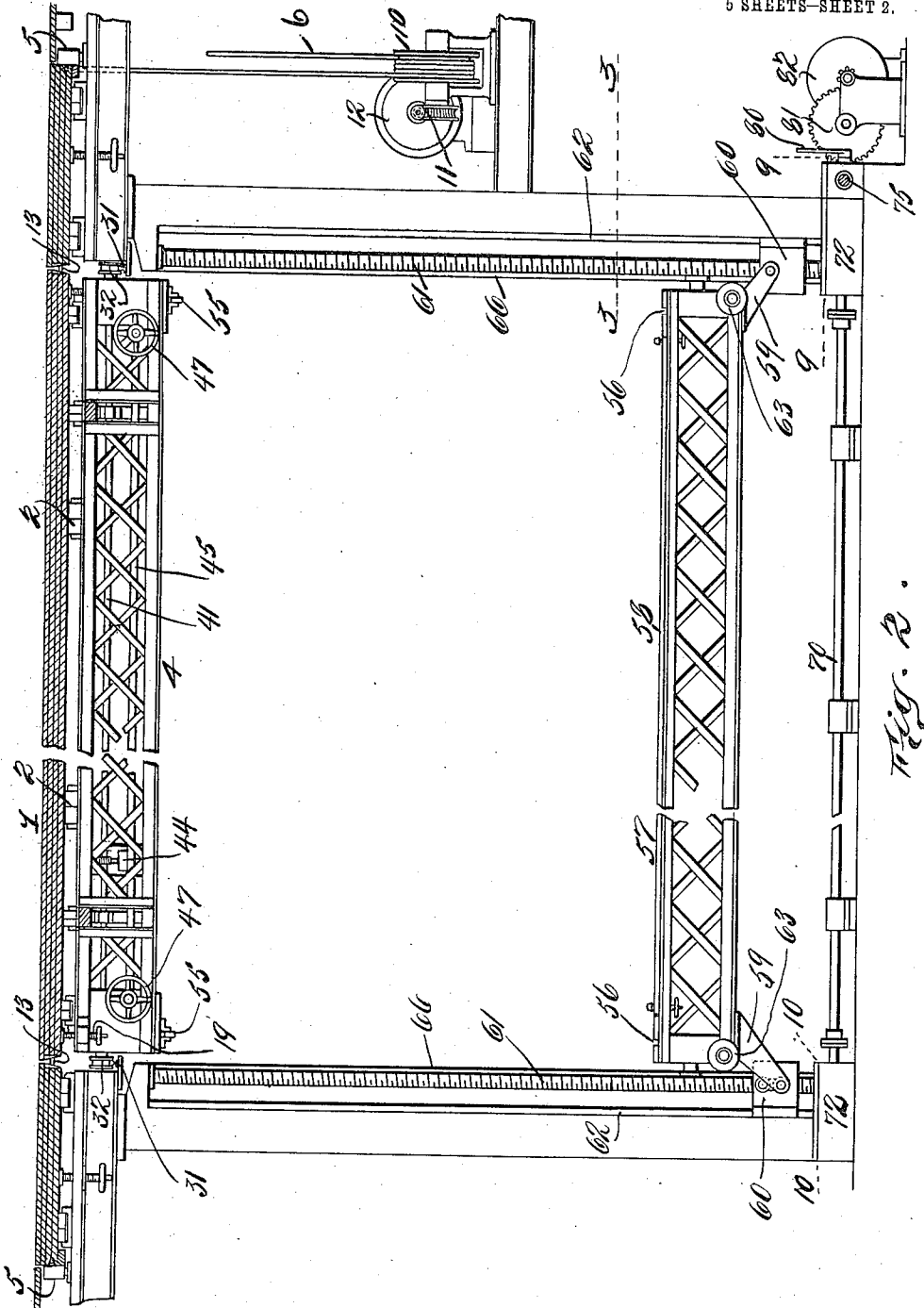


Fig. 2.

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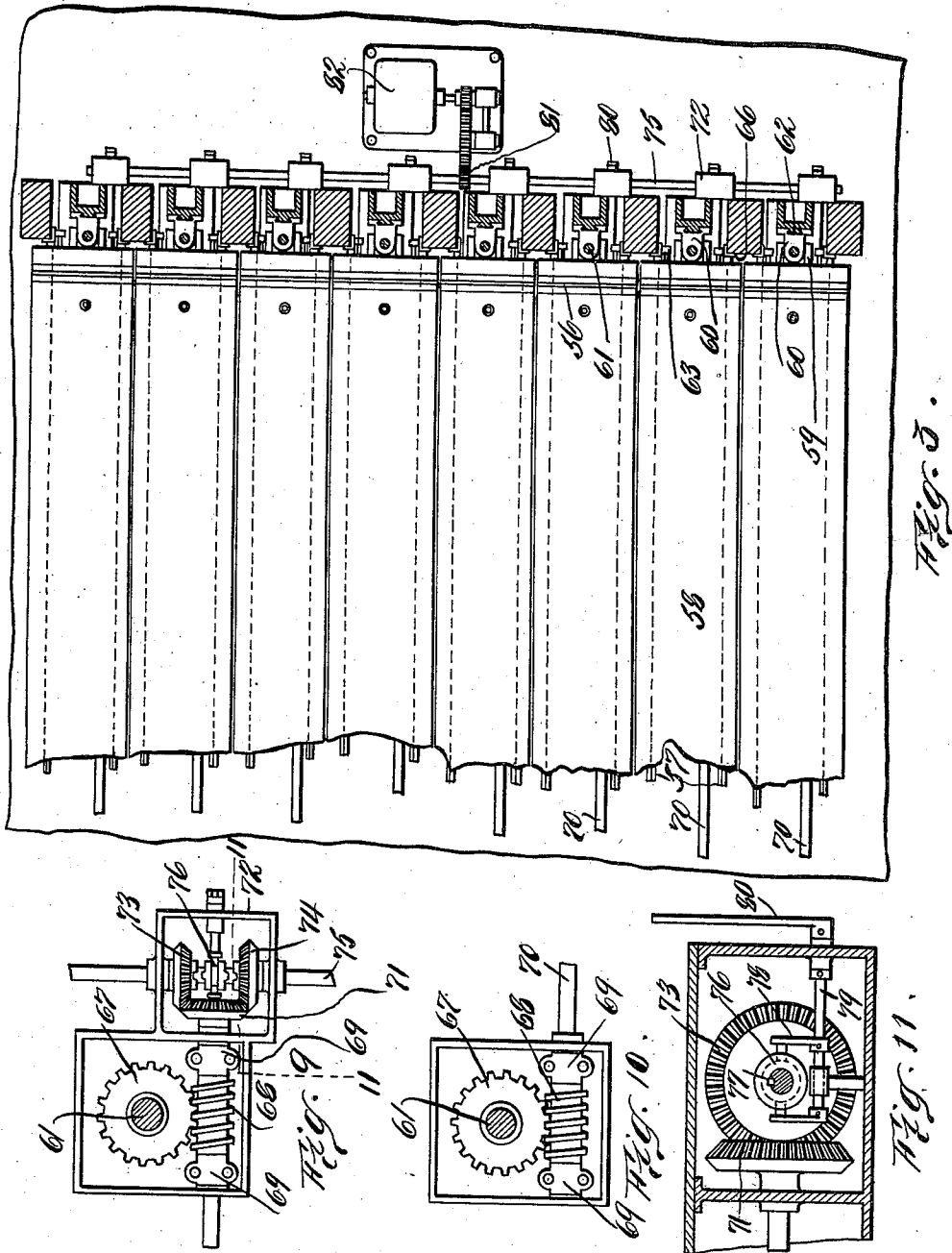
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5 SHEETS—SHEET 3.



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5 SHEETS—SHEET 4.

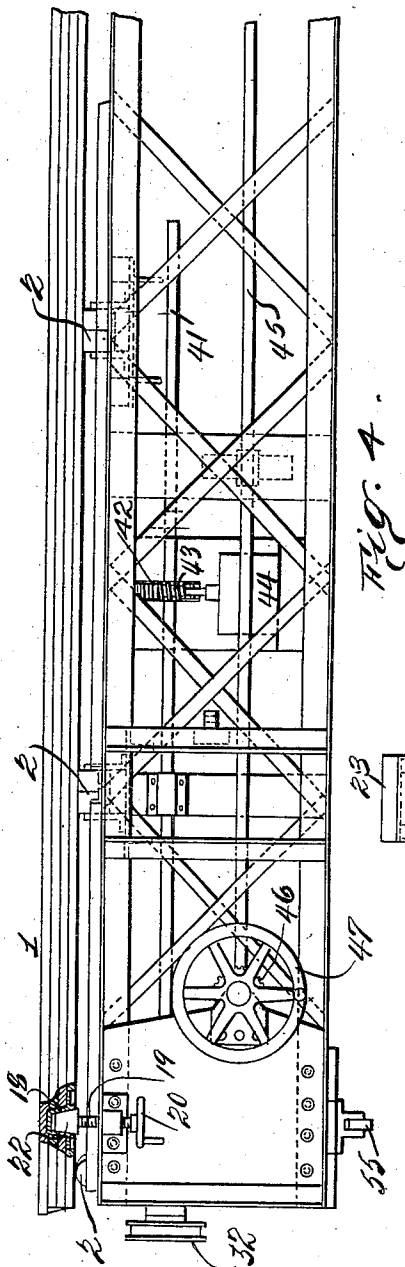


Fig. 4.

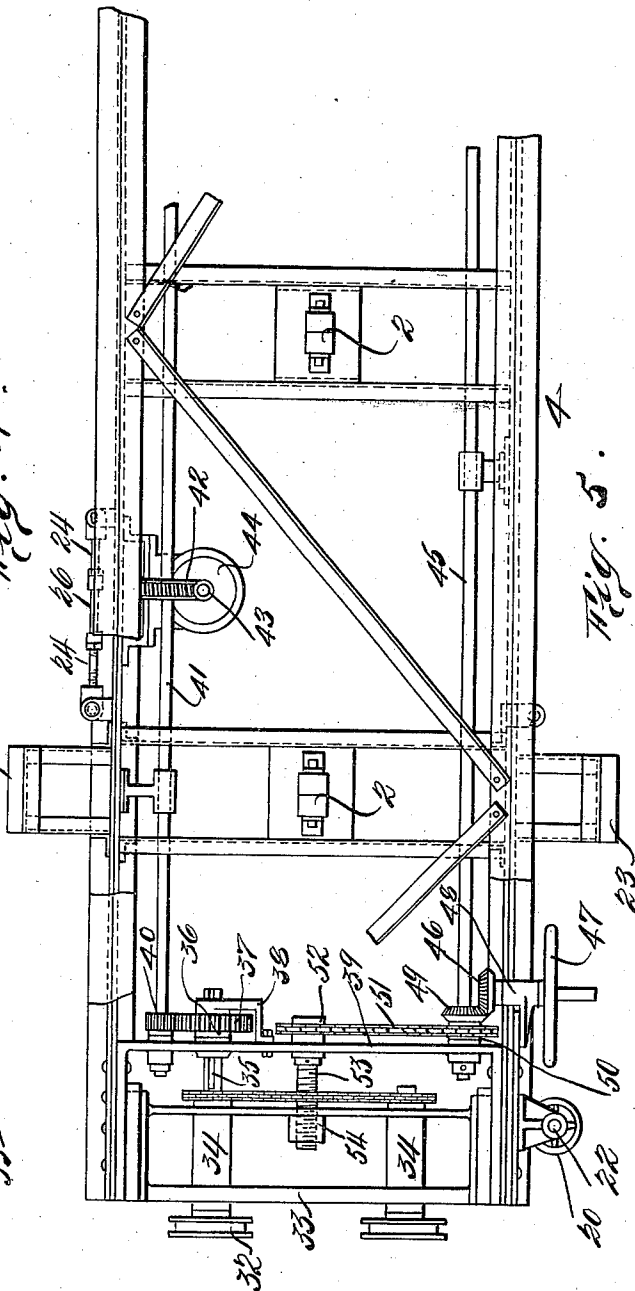


Fig. 5.

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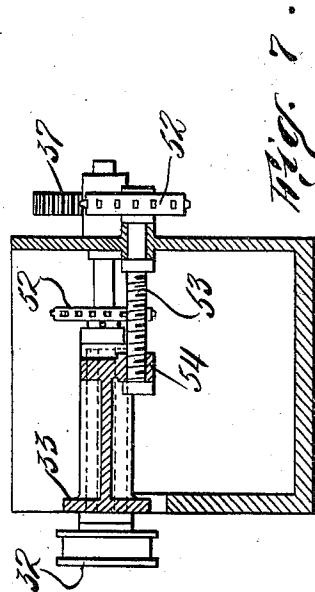
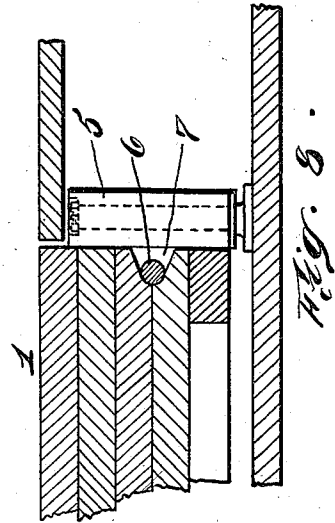
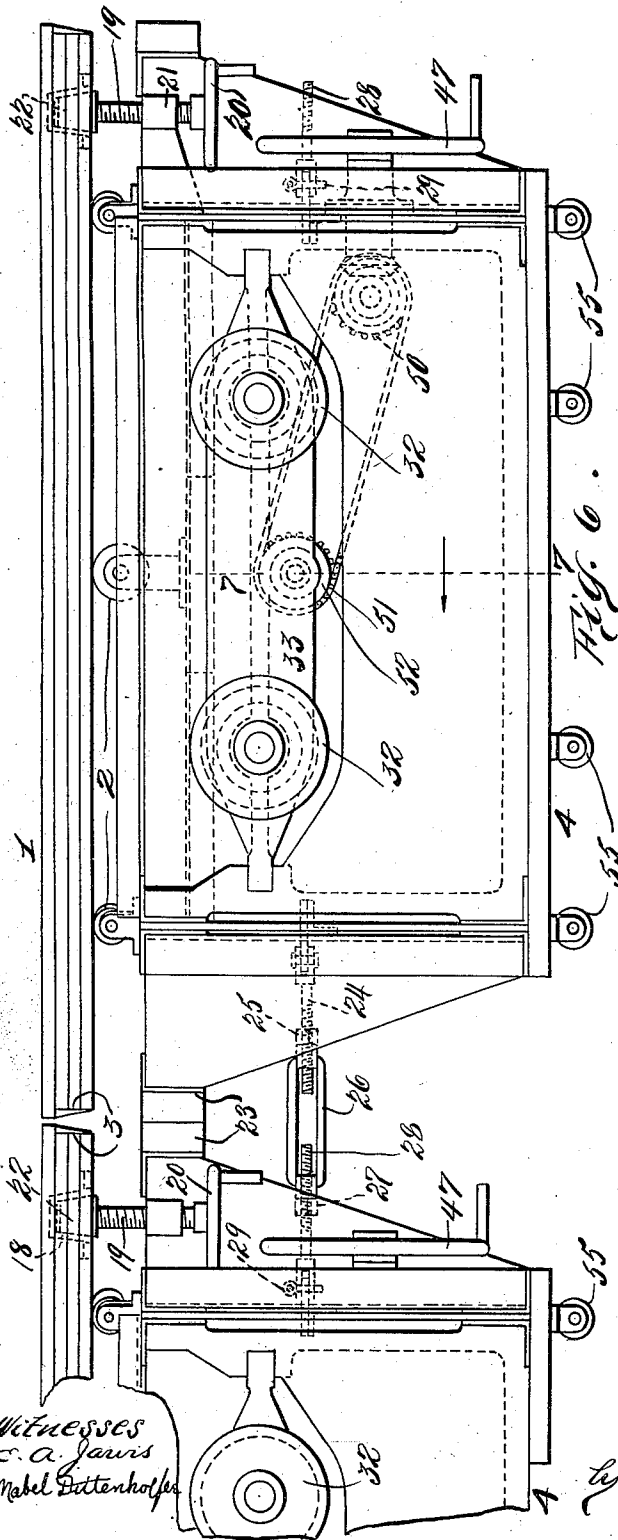
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1,045,398.

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5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

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STAGE.

1,045,398.

Specification of Letters Patent.

Patented Nov. 26, 1912.

Application filed May 28, 1910. Serial No. 563,894.

To all whom it may concern:

Be it known that I, CLAUDE L. HAGEN, a citizen of the United States, residing at New York city, in the borough of Manhattan, county and State of New York, have invented certain new and useful Improvements in Stages, of which the following is a clear, full, and exact description.

This invention relates to an improved stage and particularly to one of the rotatable type.

The object of the invention is, not only to construct a stage which as a whole may be rotated, but to provide one of a number of sections, which may be united on the plane of the stage floor and rotated, or individual sections or groups thereof may be lowered, moved forward or backward on the plane of the stage floor or below it, one section taking the place of another as desired.

The sections may follow each other into position like the sections of an endless conveyer, yet they are free to rotate on the stage floor and to change relative positions.

In short it is my object to provide a sectional rotatable stage wherein any section may be moved into any part of the rotatable whole.

In carrying out my invention I provide the stage floor with a circular opening, to accommodate my stage as a whole, and I provide means for supporting and rotating the stage therein, comprising proper supports, floor rollers, circumferential thrust rollers and means for engaging the stage to rotate it, for which I prefer to use a cable engaging the circumference of the stage.

Whether cable or other rotating means are employed it is essential that the stage be rotatable, driven from without its circumference, for no central supporting posts or permanently located circumferential tracks such as found in railway turn tables can be tolerated as they would interfere with the vertical movement of the sections.

The circular stage is composed of a number of individual sections at times united and at times unconnected. Each section is provided with a transverse supporting cradle, to which it may sometimes be positively secured, or at others it may be absolutely disconnected therefrom. The cradles are in structure like overhead traveling cranes having wheels at their ends running

in tracks beneath and at right angles to the front of the stage. Individual elevators are provided for the cradles to lower them to what I shall term the cellar and to return them to the stage floor. The wheels of the cradles must therefore be capable of being withdrawn from the tracks when the cradle is resting on the elevator. The group of elevators when in place in the cellar provides a floor on which any cradle may be moved forward or backward, and thus raised on a different elevator from that which lowered it.

The elevators it will thus be seen may be raised and lowered. The cradles may move backward and forward near the plane of the stage floor, or in the cellar on the floor formed by the elevators and they may be raised or lowered. The floor sections may partake of the same movement as the cradles or be rotated into any position on the stage floor. Any section and its cradle may be lowered to any desired depth to produce different stage setting effects and maintained at such depth. Sections may be dropped to leave openings or sinks as they may be needed.

The scope of my invention will be pointed out in the claims.

In the accompanying drawings, Figure 1 illustrates a top plan view of the rotatable sectional stage. Fig. 2 is a vertical cross-sectional view of the rotatable stage and a portion of a fixed flooring or stage adjacent thereto, the section being taken on a line 2—2 in Fig. 1. Fig. 3 is a sectional plan, the section being taken in line 3—3 in Fig. 2, and shows a portion of the elevators. Fig. 4 is an enlarged detail view, in elevation, of one end of one of the cradles which I employ to support the rotatable stage sections, both ends of said cradles being alike. Fig. 5 is a plan view of Fig. 4. Fig. 6 illustrates a full end view of one end of one of the cradles and a partial end view of an adjacent cradle. Fig. 7 is a vertical sectional view of the slidable cross-head, and support therefor, with which both ends of the cradles are provided, and which support the wheels which adapt the cradles for movement along a track under the stage, the section being taken on a line 7—7 in Fig. 6. Fig. 8 is an enlarged vertical sectional view of a portion of one of the segments which

forms part of the rotatable stage, the section being taken on a line 8—8, Fig. 1, and showing one of the thrust rollers and cable. Fig. 9 is a top plan detail view taken on a line 9—9 in Fig. 2, of one of the operating devices on the right in Fig. 2, for the threaded shafts which act to raise and lower the sections of the lower flooring, the cover of the casing being removed. Fig. 10 is a similar view taken on a line 10—10 in Fig. 2. Fig. 11 is a vertical sectional view taken on a line 11—11 in Fig. 9, showing the clutch shifting mechanism. Fig. 12 is an enlarged vertical sectional view taken on a line 12—12 in Fig. 1, showing the manner of finishing off the adjacent ends of the rotatable stage sections. Fig. 13 is a similar view taken on a line 13—13 in Fig. 1, showing a socket for one of the locating screws, and Fig. 14 is a similar view taken on a line 14—14 in Fig. 1, showing the manner of connecting the stage sections, and side segments together when the stage is rotated.

As shown in the drawings, the stage itself, when rotatable as a unitary structure, is shown at 1, and is composed of a number of superposed layers of plank sufficient to take out all spring between points of support, *i. e.*, rollers 2, which are beneath the stage. The edges between the rectangular sections of the circular stage are preferably armored by tapered bands 3 shown particularly in Fig. 12, above which tapered band part of the planking extends. The individual sections A, B, C, D, E, F, G and H, have their perimeters preferably guarded in the same manner as that shown in Fig. 12, so that as any adjacent surfaces move vertically past one another, they will take the wear and thrust thus engendered. The rollers 2, which support the stage, are carried, some on the adjacent stage flooring to the circular opening, and some on the cradles 4, which will be hereinafter described.

All of the rollers are arranged preferably radially to the center of the stage to aid in the ready turning of the same. Thrust rollers 5 are arranged around the circular stage opening. A cable slot 7 for a cable 6 shown enlarged in Fig. 8 is provided for rotating the stage. This cable 6 passes over sheaves 8 and 9, and leads to a drum 10 geared by suitable worm and gear connection 11 to a motor 12. The cable 6 is reversed upon the drum, so that it will pay out and take up equally. The cable 6, where it leaves the drum preferably leaves it in opposite directions, and on a line tangential to the drum, so that no undue thrust will be placed upon the thrust bearings.

As shown particularly in Fig. 1, the sections A to H inclusive, are sections which are adapted to be raised and lowered. The segment sections I, J, K and L are not

adapted to leave the plane of the stage floor under ordinary conditions. These segment sections may be bound together in addition to the binding by the cable 6 by any suitable means, such as plates 7^a shown in Fig. 1, which secure the end sections H and A to the side sections K and I, the plates 7^a are releasably bolted to the section H and A.

Triangular sections M, N, O and P may be secured at the corners of the vertically movable sections A and H, and be supported by the cradle of such sections, or be bolted to the stage flooring, so as to partake of no vertical movement, either of which may be done as desired. To lock the rectangular sections to the segment sections, I may provide suitable bolt or latch mechanism, such as 12', shown in detail in Fig. 14, and provided with a movable latch 13, latch casing 14, toothed rack 15, worm drive 16, key 17 to project the latch from one section to the other, not only centering the two sections, but holding them against relative horizontal movement. It will be seen that such latch is entirely within the plane of the superposed layers of flooring, and in fact, not only is the top of the rotatable stage free from all projections, but its under side is also free, whereby it may be readily turned on the supporting rollers. Each section, that it may be properly brought into register with its cradle and leveled one section relatively to the next, is preferably provided with inserted castings in the shape of pockets shown at 18 in Fig. 13, while screws 19 operated by hand wheels 20 or other suitable means, are provided, turning through brackets 21 on the cradle and provided with tapered plug-like ends 22 adapted to engage the pockets 18. The ends of the cradles are provided with abutments 23 to space them apart, and when properly spaced with the abutments 23 in engagement, the sectional flooring, will be held in proper close contact with the other, being held by the screw 19 provided with the hand wheel 20.

To hold the cradles better in their proper adjusted position, I pivotally secure to one cradle, a screw 24 having a lock nut 25 properly set, a turn buckle 26 abutting at its other end, a lock nut 27 on a similar screw 28, which screw is formed with an eye at one end secured to the adjoining cradle by a pin 29. When the turn buckle and its lock nuts are once adjusted, and the pin is put in place, the abutments 23 will always be brought into correct register by the mere turning of the turn buckle up to its lock nuts. The cradles 4 are constructed quite similar to ordinary overhead traveling cranes, that is, they are preferably of open work steel girder construction, such that the horizontal open work may be readily omitted between the side channels to permit the placing of drops 30 in the sectional floor-

ing, so that people or articles may be dropped through such openings or lifted out of the same.

Along the underside of the stage floor there are fore and aft rails 31 mounted on suitable brackets and shown particularly in Fig. 2. On these rails, wheels 32 preferably two for each end of each cradle, are adapted to travel back and forth. Means are also provided to permit these wheels to be retracted at the proper time, so that the cradles may pass down free of the rails and the elevators hereinafter described. The wheels 32 are mounted in a cross head 33, by means of suitable bearings 34. One of the wheels is provided with a splined shaft 35 passing through a hub 36 of a gear 37 mounted on a bracket 38, and secured to a cross bar 39 of the cradle. A pinion 40 meshes with the gear 36, which pinion is mounted on and driven by a shaft 41, worm wheels 42, wormed gear 43 and motor 44 mounted on the cradle. It will be understood that the opposite sides of the cradle are similar, and that duplicate wheels, bushings and shafts are supplied, or operated from the motor 44 so that upon the rotation of the motor and its shaft, the wheels 32 will be driven to move the cradle backward and forward according to the direction of rotation of the motor. A shaft 45 extends transversely to the cradle, and is operated by a beveled gear 46 and hand wheel 47, mounted in a bracket 48 on the cradle, a beveled gear 49 being provided. A sprocket 50 on the shaft 45 meshes with a chain 51, which chain drives a sprocket 52 on a screw shaft 53, which screw meshes with a nut 54 secured to the cross head 39, so that upon rotating the hand wheel and shaft 45, the screws 53 at each end of the cradle will be rotated to draw in the cross heads and their wheels 32, that the ends of the cradles may be free and clear of the rails 31. It is obvious in such condition that the elevators must first lift the cradles above the rails and support the cradles when the wheels are withdrawn. Beneath the cradles I provide wheels 55, so that a cradle, when it is resting on an elevator of the row of elevators, such as shown in Fig. 3, may be pushed forward or backward with the wheels 55 in the grooved brackets 56.

Each cradle elevator is preferably in the form of a lattice beam, such as shown in Fig. 2 at 57, and provided with a flooring 58. Brackets 59 secured to studs on threaded blocks 60 serve to support the elevator at each end on vertical screws 61. The blocks may slide on brackets 62: the elevator beams may be provided with rollers 63 resting against rails 66, Figs. 2 and 3, and guide shoes may be provided at the ends of the elevators to keep one elevator always in line with the rest of them, such guide shoes

sliding vertically on said rails 66. Each elevator may be independently operated by means of the mechanism shown, particularly in Figs. 3, 9, 10 and 11. The screw shafts 61 are rotated by worm gears 67, rotated by worms 68 mounted between suitable thrust bearings 69, such devices being duplicated at each side of the elevator. A shaft 70 connects the two worms 68. The shaft 70 is rotated by a beveled gear 71 mounted in the casing 72, and engaged by oppositely disposed beveled gears 73, and 74, and mounted freely on a motor driving shaft 75. A clutch 76 sliding on a spline 77 on the motor shaft 75 is adapted through brackets 78, a shaft 79 and lever 80 to be brought into contact with either of the gears 73 or 74, to rotate the shafts 61 in either desired direction to raise or lower the individual elevator. The shaft 75 is driven either continuously or when desired by means of a train of gearing 81, and a motor 82, shown particularly in Fig. 3.

In operation the device may occupy the position shown in Figs. 1 and 2 in which all sections, rectangular, triangular, segment and the main flooring of the stage surrounding the circular opening, may be stationary, and provide an ordinary stage flooring. The rectangular and segment sections which are surrounded by the drive rope 6 may be rotated by the motor shown in Fig. 2, which controls the drum 10 through the worm gear 11, so as to rotate the stage into any given position. Hence one may set a scene on each one of the four quarters of the stage, or on any other division and rotate the stage to present the new scene to the audience a moment or two after lowering the curtain, and the stage hands may remove the rear scene and reset the same during the act which is going on on the front section in some instances. The vertically movable rectangular stage sections, when the apparatus is in the position of Fig. 1, may be lowered on their cradles to any desired degree to provide "sinks" and the consequent stage effects which are produced thereby. The apparatus may be in the position of Fig. 1, a cradle remove section G to the lower floor of the theater beneath the stage floor, remove section F with it, a scene may be played in the meantime on sections A, B, C, D, and E, sections G and F set on the floor below, moved forward until they come under sections B and C for example, the curtain lowered, sections B, C, D and E moved back, sections F and G raised from below with their setting to take the place of B and C, and the curtain raised, in a fraction of the time taken to set a new scene.

Another example of the uses of the device is shown in the following: Before the play two scenes are set. The first scene is acted, the curtain lowered, the stage rotated

to present the second scene to the audience, which leaves the stage in the position of Fig. 1. During the playing of the second scene the rear sections may be lowered with the first scene thereon, the scenery removed and a new scene set. Before lowering the curtain the lowered sections will be set toward the front of the house, rolling over the cradles. After the curtain is lowered the scene just played will be moved back and the scene set below lifted up into place. The combinations possible are varied, and almost any effect or any arrangement of stage setting which does not take more than half of the stage in depth can be carried out without any tiresome waits between acts, so long as the act in progress takes as long as it takes to set a scene on the floor below.

In carrying out this invention, details of construction may be varied from those shown, and yet the essence of the invention be retained; some parts might be employed without others, and new features thereof might be combined with elements old in the art in diverse ways, although the herein described type is regarded as embodying substantial improvements over such modifications.

As many changes could be made in the above construction, and many apparently widely different embodiment of the 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 in an illustrative and not in a limiting sense.

It is furthermore desired to be understood that the language used in the following claims is intended to cover all the generic and specific features of the invention herein described, and all statements of the scope of the invention which as a matter of language might be said to fall therebetween.

I claim as my invention:

1. The herein described stage, composed of a plurality of movable sections, means for moving said sections forwardly or backwardly in a horizontal plane, and means for moving any of said sections vertically out of the plane of the other of said sections, to permit of the horizontal movement of the remaining sections.

2. The herein described stage composed of a plurality of movable sections, means for moving said sections forwardly or backwardly in a horizontal plane, means for moving any of said sections vertically out of the plane of the other of said sections to permit of the horizontal movement of the remaining sections, segment sections attachable to the aforesaid movable sections having a curved periphery whereby a circular stage is formed, and means for rotating said stage.

3. The herein described stage consisting of a plurality of sections, a wheeled cradle adapted to support a section, rails for the wheeled cradle so located that a section may be moved near the plane of the stage flooring, and a vertically moving elevator for the cradle.

4. The herein described stage, having a renewable section, a cradle, elevating means for the cradle, adapted to lower the same and return the section in different vertical position.

5. The herein described stage, having a section, a cradle, elevating means for the cradle, adapted to lower the same and return the section in different vertical position, means for supporting the cradle and for moving it back and forth when near the stage floor and off the elevating means.

6. The herein described stage, having a section, a wheeled cradle for the section, rails for the wheeled cradle, on which it may be moved near the plane of the stage floor, a vertically moving elevator for the cradle, means for disconnecting the section from its cradle, that it may be moved horizontally away.

7. The herein described stage having a plurality of sections, a cradle for each section, elevating means for the cradle, means adapted to permit the shifting of the cradle, and its section, horizontally below the plane of the stage, whereby the section and cradle may be again raised by the elevating means to the stage floor in a different position from its original one.

8. The herein described stage having a plurality of sections, a cradle for each section, elevating means for the cradle, means adapted to permit the shifting of the cradle, and its section, horizontally below the plane of the stage, whereby the section and cradle may be again raised by the elevating means to the stage floor in a different position from its original one, rails and wheels near the stage floor, on which all sections not supported by elevating means may be moved horizontally.

9. The herein described stage, having a section, a wheeled cradle for the section, rails for the wheeled cradle on which it may be moved near the plane of the stage floor, a vertically moving elevator for the cradle, means for disconnecting the section from its cradle, that it may be moved away therefrom, and rollers between the section and the cradle.

10. The herein described stage having a plurality of sections, a cradle for each section, elevating means for the cradle, means adapted to permit the shifting of the cradle and its section horizontally below the plane of the stage, whereby the section and cradle may be again raised by the elevating means to the stage floor in a different position from

its original one, railways between each section and its cradle, and means for locking all sections together when on their cradles, whereby the complete sections may be rotated with reference to their cradles.

11. The herein described stage having a plurality of sections, a cradle for each section, elevating means for the cradle, means adapted to permit the shifting of the cradle and its section horizontally below the plane of the stage, whereby the section and cradle may be again raised by the elevating means to the stage floor in a different position from its original one, rails and wheels near the stage floor, on which all sections not supported by elevating means may be moved horizontally, railways between each section and its cradle, and means for locking all sections together when on their cradles, whereby the complete sections may be rotated with reference to their cradles.

12. The herein described stage, having a section, a wheeled cradle for the section, rails for the wheeled cradle on which it may be moved near the plane of the stage floor, a vertically moving elevator for the cradle, in combination with other similar sections and parts making together a circular stage and means for rotating the whole.

13. The herein described stage, having a section, a wheeled cradle for the section, rails for the wheeled cradle, on which it may be moved near the plane of the stage floor, a vertically moving elevator for the cradle, means for disconnecting the section from the cradle, that it may be moved away therefrom, in combination with other similar sections and parts making together a circular stage and means for rotating the whole.

14. The herein described stage, having a section, a cradle, elevating means for the cradle, adapted to lower the same and return it in different vertical position, means for disconnecting the section from its cradle, that it may be moved away therefrom, in combination with other similar sections and parts making together a circular stage and means for rotating the whole.

15. The herein described stage, having a section, a cradle, elevating means for the cradle, adapted to lower the same, and return it in different vertical position, means for supporting the cradle and for moving it back and forth when near the stage floor and off the elevators, means for moving the section horizontally away from the cradle, in combination with other similar sections and parts making together a circular stage and means for rotating the whole.

16. The herein described stage, having a section, a wheeled cradle for the section, rails for the wheeled cradle on which it may be moved near the plane of the stage floor, a vertically moving elevator for the cradle,

means for disconnecting the sections from its cradle, that it may be moved away therefrom, rollers between the section and the cradle, in combination with other similar sections and parts making together a circular stage and means for rotating the whole.

17. The herein described stage, having a section, a cradle, elevating means for the cradle, adapted to lower the same and return it in different vertical position, means for disconnecting the section from its cradle, that it may be moved away therefrom, rollers between the section and the cradle, in combination with other similar sections and parts making together a circular stage and means for rotating the whole.

18. The herein described stage, having a section, a cradle, elevating means for the cradle, adapted to lower the same, and return it in different vertical position, means for supporting the cradle and for moving it back and forth when near the stage floor and off the elevators, means for moving the section horizontally away from the cradle, rollers between the section and the cradle, in combination with other similar sections and parts making together a circular stage and means for rotating the whole.

19. A stage comprising a plurality of sections, each section being removable as herein described, each section having adjusting sockets, a cradle for the section and adjusting plugs on the cradle for the sockets.

20. A stage comprising a plurality of sections, each section being removable as herein described, each section having adjusting sockets, a cradle for the section and adjusting plugs on the cradle for the sockets, and means for withdrawing the plugs from the sockets to free the cradle and its socket.

21. A stage comprising a plurality of sections, each section being removable as herein described, each section having adjusting sockets, a cradle for the section and adjusting plugs on the cradle for the sockets, and supporting railways between the cradle and the section.

22. A stage comprising a plurality of sections, each section being removable as herein described, each section having adjusting sockets, a cradle for the section and adjusting plugs on the cradle for the sockets, and means for withdrawing the plugs from the sockets to free the cradle and its section, and supporting railways between the cradle and the section.

23. A sectional stage having sections formed as segments of a circle and rectangular sections therewithin, and means for rotating all together.

24. A sectional stage having sections formed as segments of a circle and rectangular sections therewithin, and means for rotating all together, and individual supporting cradles for said sections.

25. A vertically and horizontally movable
cradle for a stage section consisting of
wheels for horizontal movement a perma-
nent track therefor, means for withdrawing
5 the wheels to clear the track in combination
with an elevator for the cradle.

26. A vertically and horizontally movable
cradle for a stage section adapted for hori-
zontal movement on a permanent track,
10 wheels carried by said cradle, means for
withdrawing the wheels to clear the track
in combination with an elevator for the
cradle, a motor on the cradle adapted to
drive said wheels.

15 27. A stage consisting of a plurality of
sections, cradles for the sections, means for
moving the cradles vertically and hori-
zontally, means for securing adjoining
cradles together.

28. A stage consisting of a plurality of 20
sections, cradles for the sections, means for
moving the cradles vertically and hori-
zontally, means for securing adjoining
cradles together, in combination with posi-
tioning and securing devices between the 25
cradles and their sections.

29. In a stage of the kind described, a
plurality of adjacent stage sections, a plu-
rality of adjacent cradles, one for each sec-
tion, the stage sections being movable upon 30
the cradles, a plurality of adjacent elevators,
an elevator beneath each cradle.

Signed at Cincinnati, Ohio this 19th day
of May 1910.

CLAUDE L. HAGEN.

Witnesses:

H. R. JAMES,
LOU DITTOE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."
