

(No Model.)

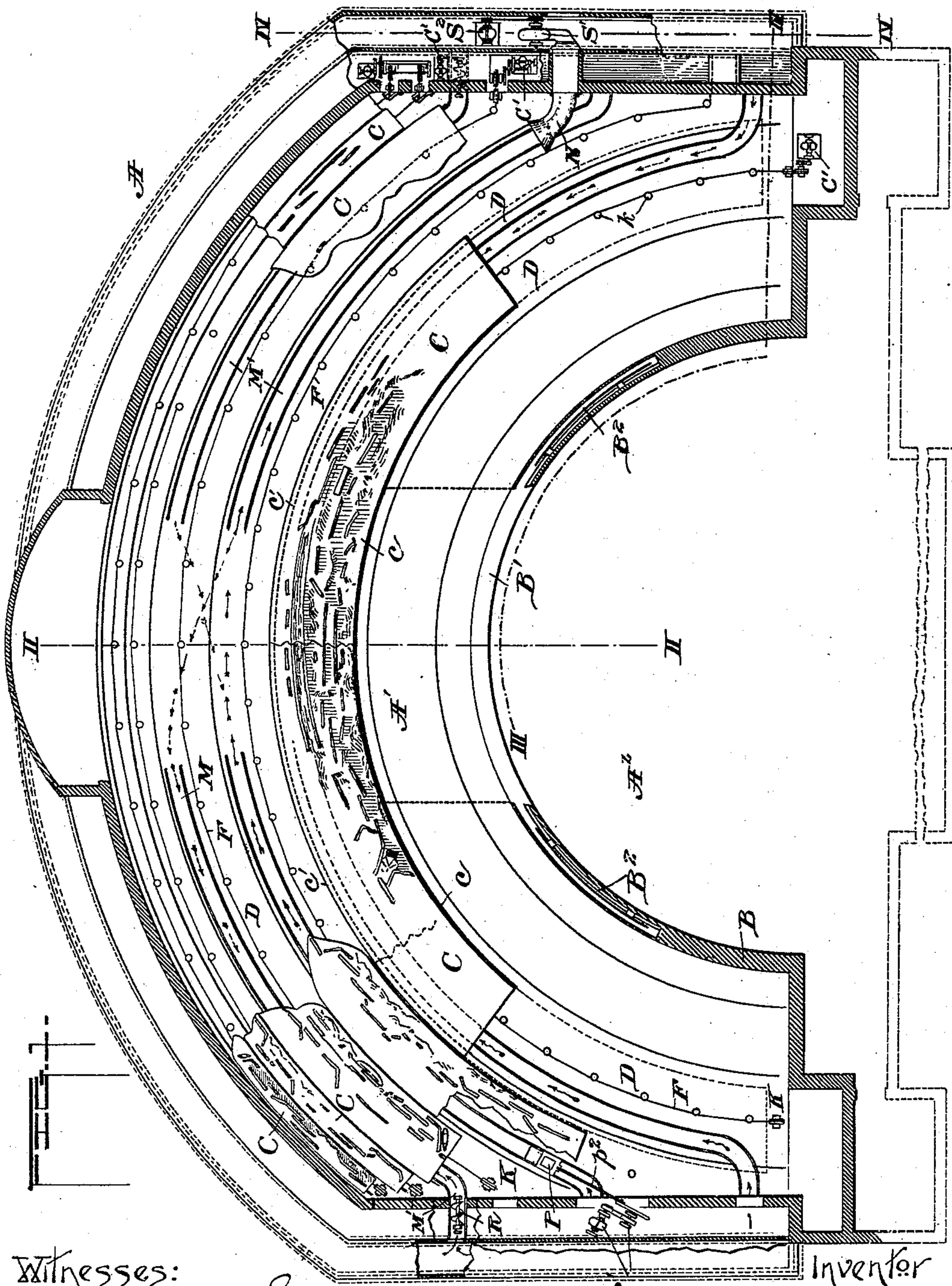
8 Sheets—Sheet 1.

S. MACKAYE.

APPARATUS FOR PRODUCING INCREASED REALISM IN SCENIC EFFECTS.

No. 490,490.

Patented Jan. 24, 1893.



Witnesses:

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Chas. E. Rindon.

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Steel Mackaye

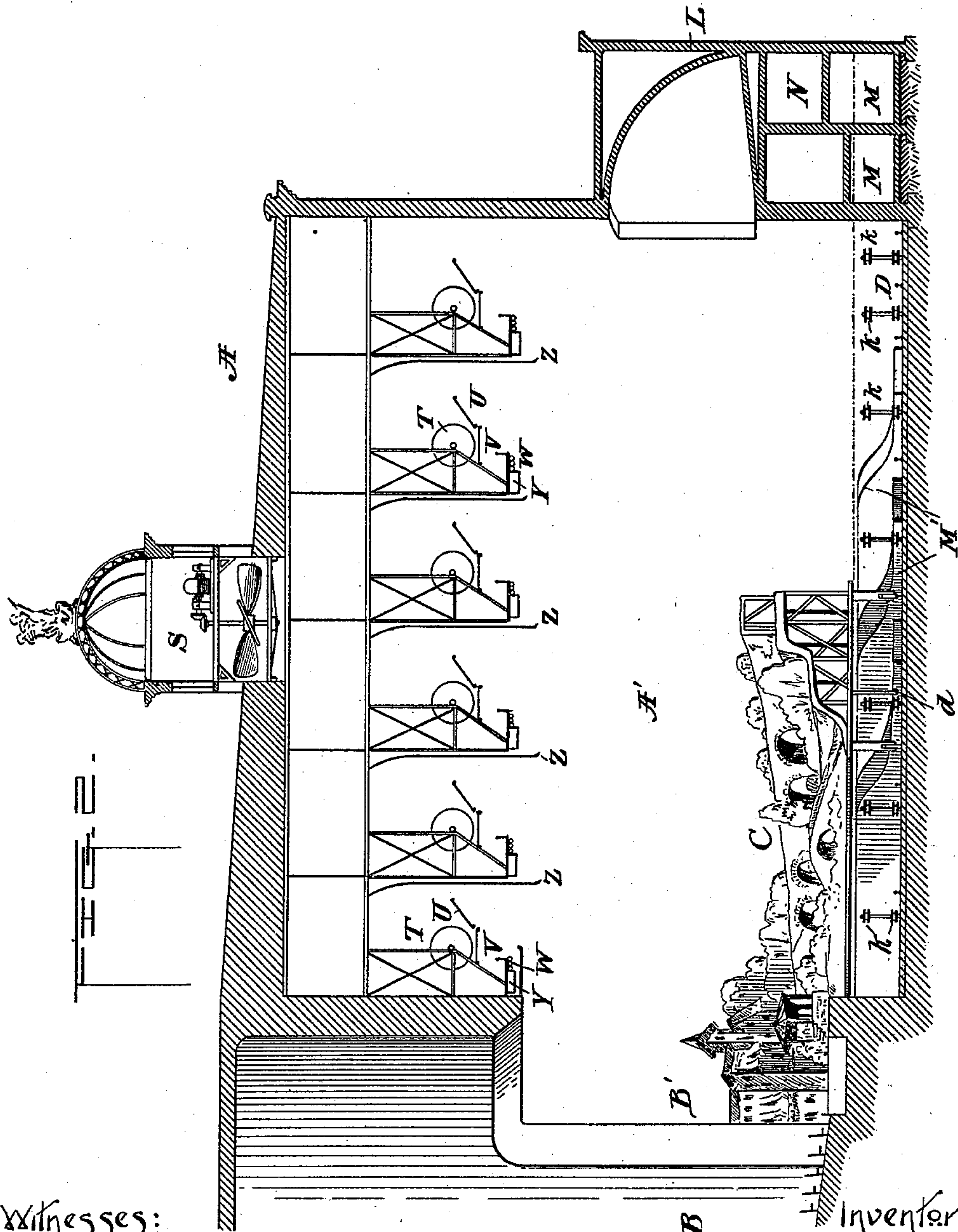
By Buttrick & Dowell
Attorneys

(No Model.)

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No. 490,490.

Patented Jan. 24, 1893.



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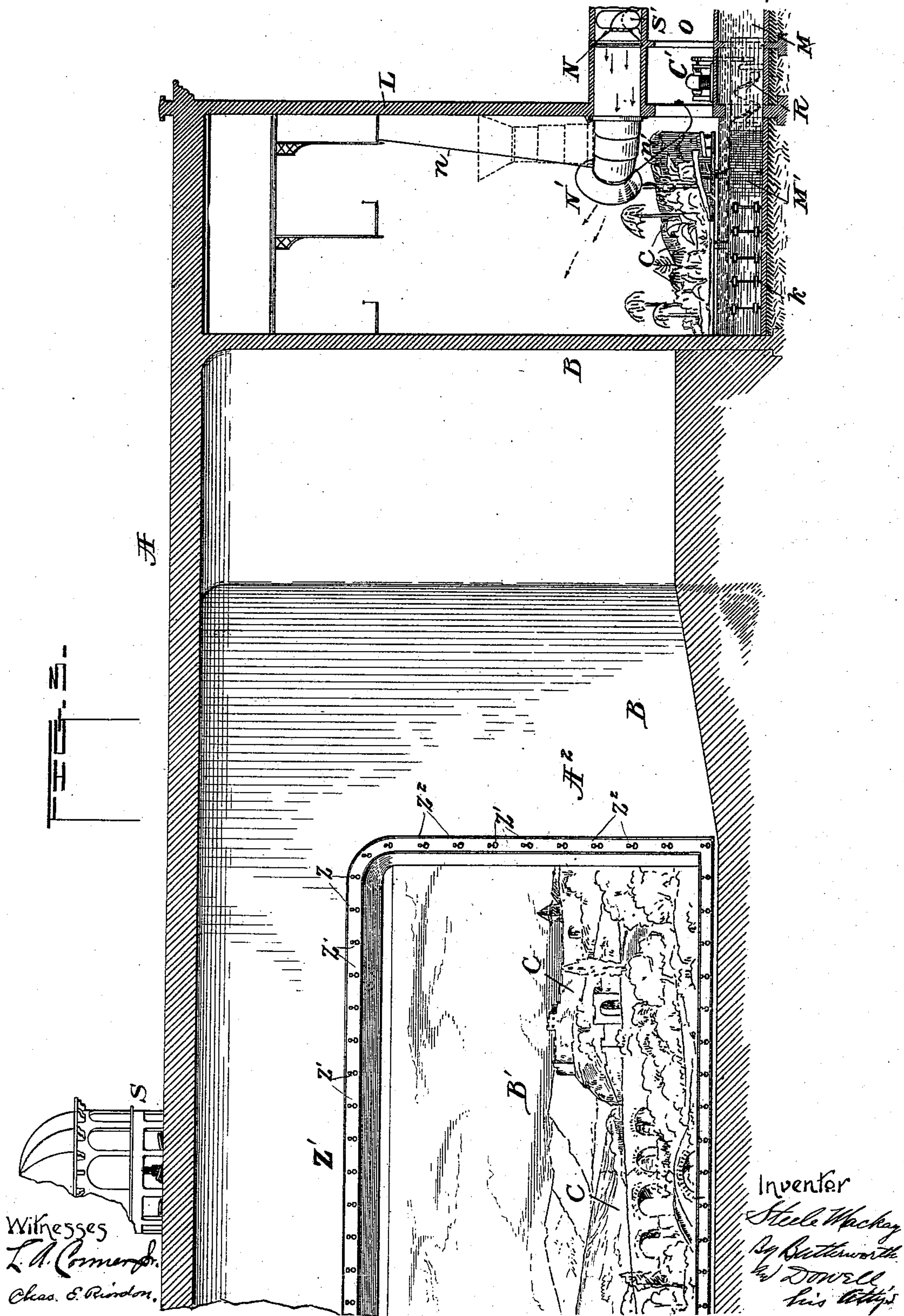
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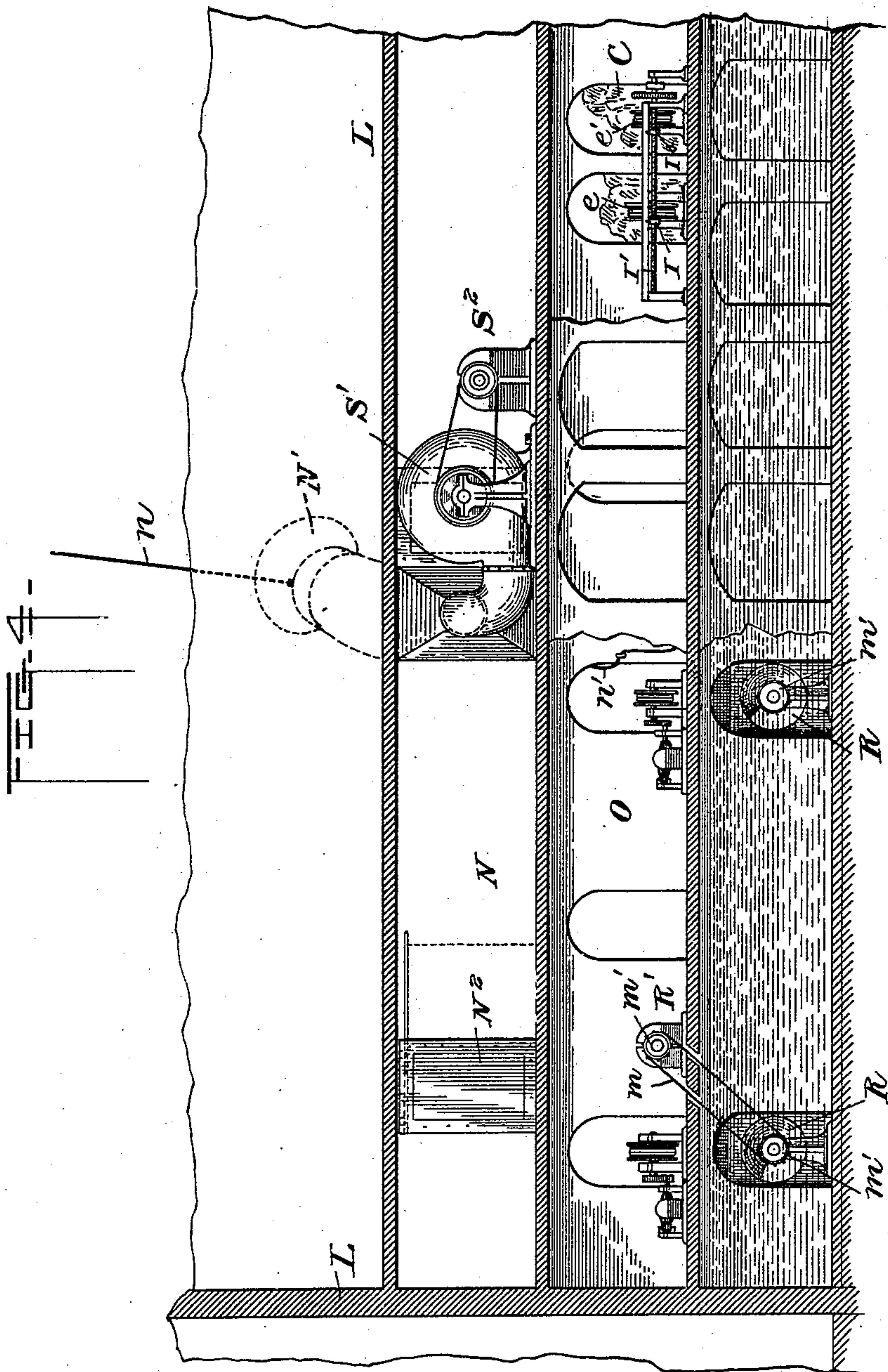
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Patented Jan. 24, 1893.



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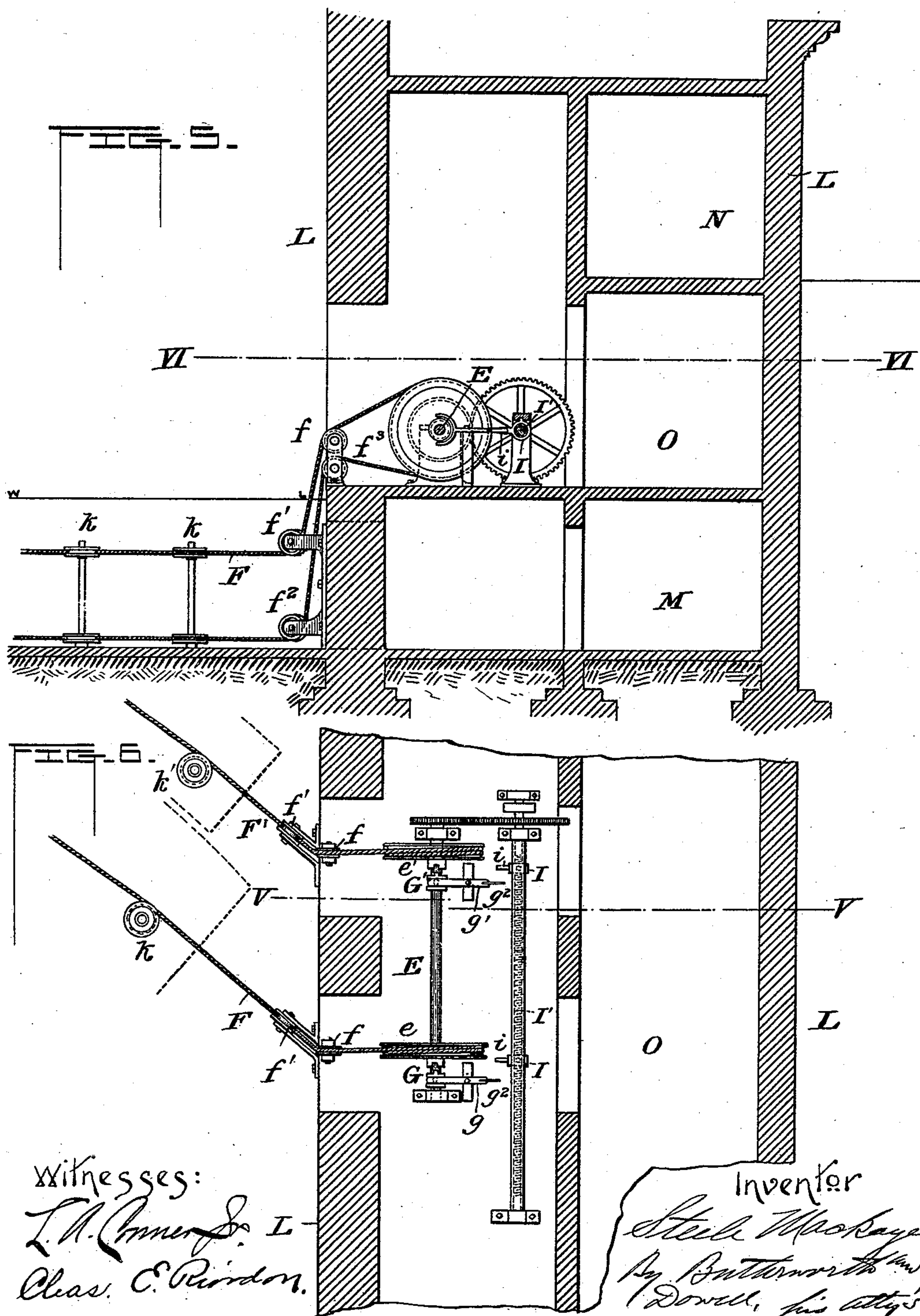
8 Sheets—Sheet 5.

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No. 490,490.

Patented Jan. 24, 1893.



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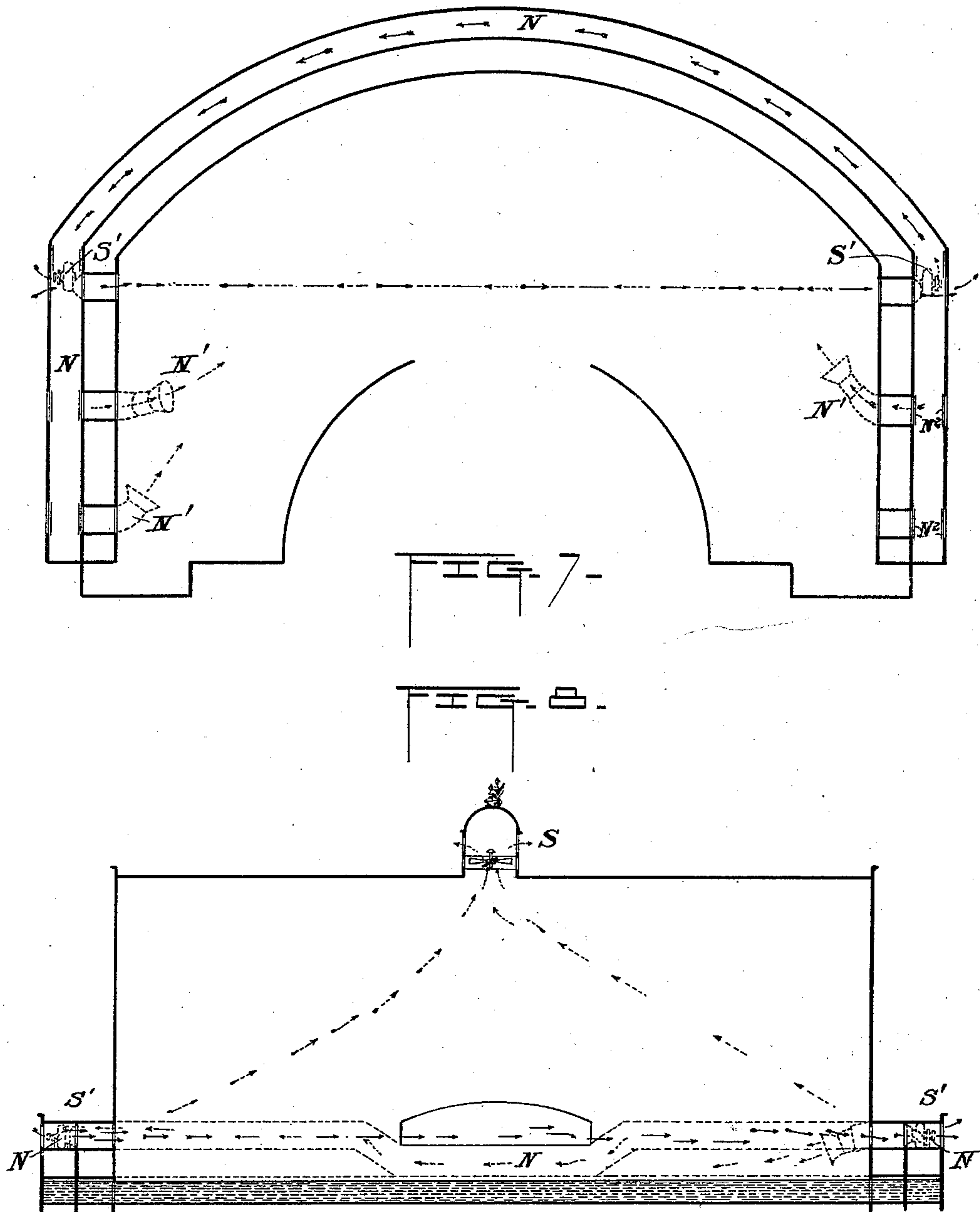
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Patented Jan. 24, 1893.



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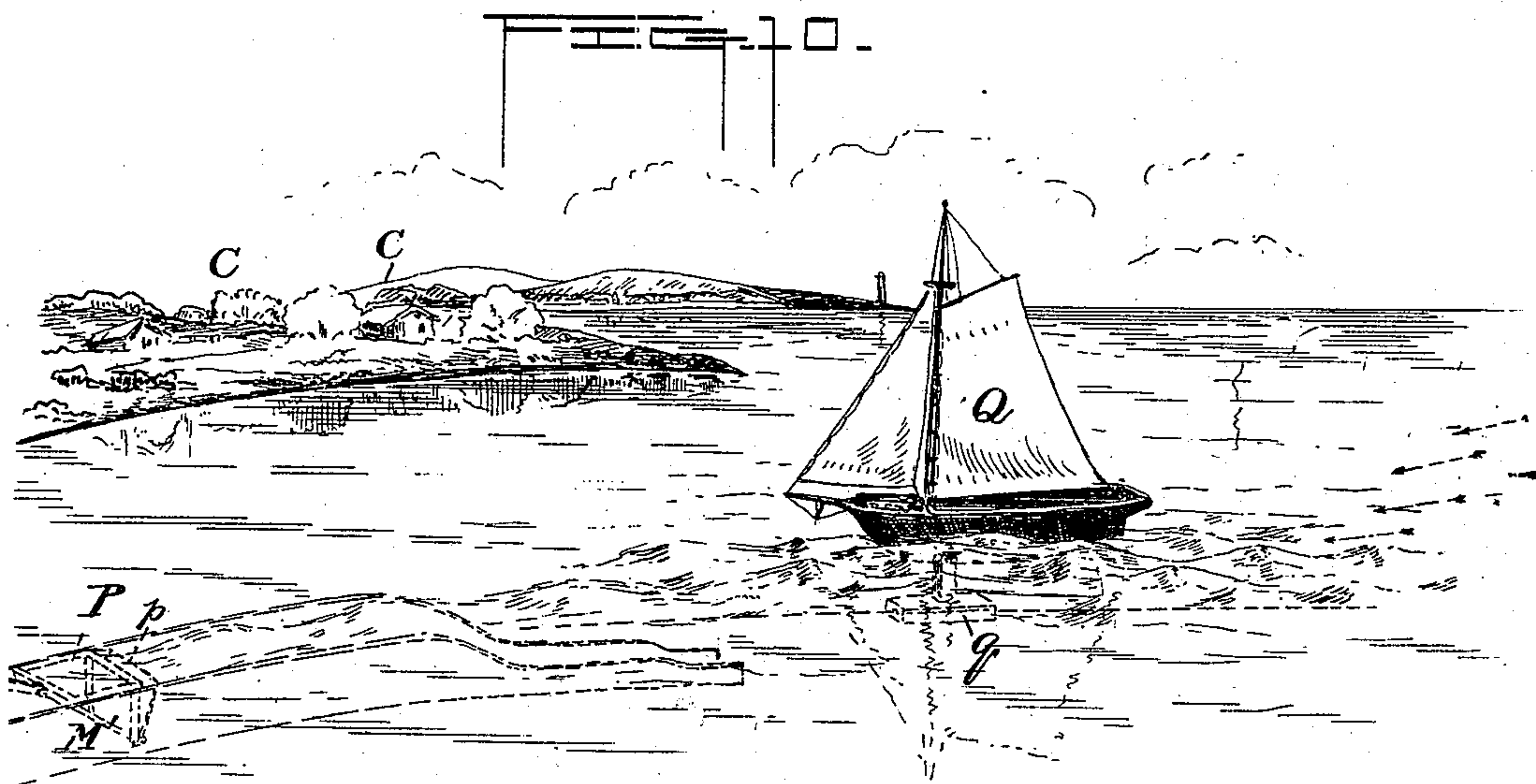
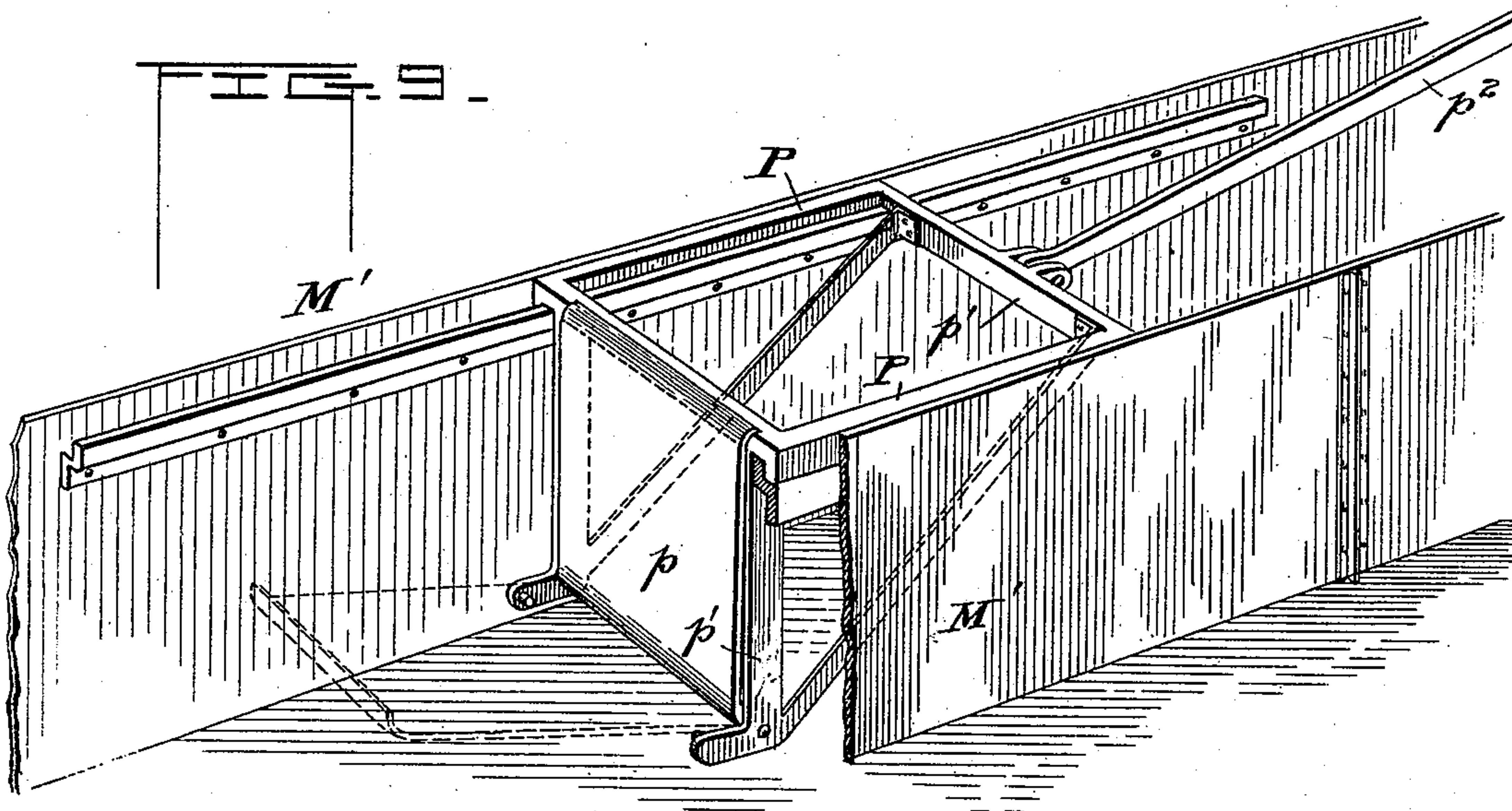
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No. 490,490.

Patented Jan. 24, 1893.



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(No Model.)

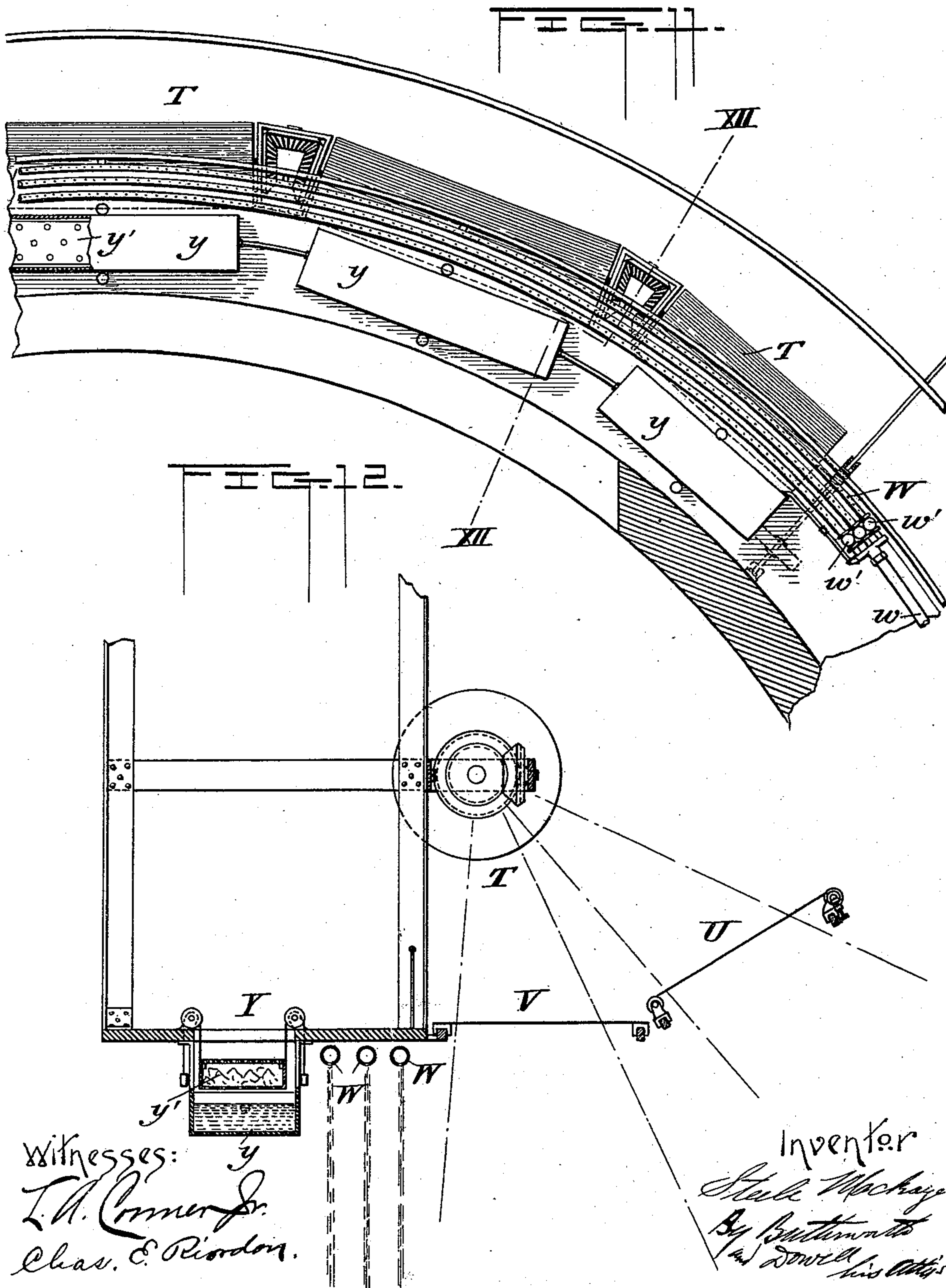
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No. 490,490.

Patented Jan. 24, 1893.



THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

STEELE MACKAYE, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE SPECTATORIA COMPANY, OF SAME PLACE.

APPARATUS FOR PRODUCING INCREASED REALISM IN SCENIC EFFECTS.

SPECIFICATION forming part of Letters Patent No. 490,490, dated January 24, 1893.

Application filed May 28, 1892. Serial No. 434,743. (No model.)

To all whom it may concern:

Be it known that I, STEELE MACKAYE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Apparatus for Producing Scenic Effects and Increasing Realism; and I 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.

This invention relates to apparatus for producing scenic effects, and the primary object is to increase realism in such performances or entertainments. To this end I have devised improved means for producing various scenic effects in imitation of natural or other scenery, and means for making various combinations for the attainment of any desired scenic effect, or the exhibition of any desired performance, these several appliances being particularly designed for the presentation or representation of important historical or other events—for instance, the discovery of America by Columbus, the burning of Rome, or the like—and the peculiar combination of apparatus permitting a vivid illustration or imitation in such exhibitions of various occurrences and natural or other scenery, either on land or water, in such manner as to give the effect of the actual occurrence and to represent persons or objects, either moving or stationary, and places and things situated at near and distant points as they appear to the eye of an observer located at any particular point; near and distant moving objects being made to move at different rates of speed for the production of perspective moving scenic effects.

The invention consists primarily in a combination of movable stages adapted to support and carry such scenic arrangements, machinery, property or persons as may be required for the exhibition or performance, and which are capable of being moved and combined upon the foundation floor of the scenic department of a theater, public hall or other place of amusement in such manner as to produce the desired scenic effect, or to facilitate any desired instantaneous modification in the scenic arrangements. Secondly:—In a com-

bination of movable stages for making combinations for the attainment of the desired scenic arrangement or effect, together with guiding rails, cables and other suitable directing or steering apparatus and actuating mechanism for causing the stages to move at the same or at different rates of speed, as may be desired, for the production of perspective or other moving scenic effects, and for the improvement and increase of realism in such performances or exhibitions. Thirdly:—In various combinations of movable stages and stage appliances with improved weather-making apparatuses, illuminating and coloring devices, and cloud and cloud-shadow makers, for the production of various storm effects, the illumination and coloring of the scenery, and the imitation of clouds and cloud-shadows moving through the sky or over the land or water scenic arrangements;—and finally, in certain details of construction and combinations of parts all as will be hereinafter described and particularly pointed out in the claims at the end of this specification.

The several appliances hereinafter particularly described are especially adapted for the presentation of a new order of entertainment to which I have given the name "spectatorio," and which combines to the best possible advantage advanced realism in scenic art with pantomime and music. The building in which these entertainments are presented I term a "spectatorium," and I call a plurality of such buildings "spectatoria." The scenic department or foundation floor upon which are placed the scenic arrangements, property or persons necessary to produce the desired scenic effect I term the "scenitorium."

Referring to the accompanying drawings which form a part of this specification and in which similar letters of reference are used to denote similar parts in each of the several views, Figure 1, is a horizontal section of the scenic department or scenitorium of a spectatorium or building designed for the exhibition of spectacular or dramatic performances; Fig. 2, is a sectional elevation on the line II—II of Fig. 1; Fig. 3, is a partial sectional view taken on line III—III of Fig. 1; Fig. 4 is a partial sec-

tional view taken on line IV—IV of Fig. 1; Fig. 5, is a detail vertical section showing the stage actuating mechanism; said section being taken on the line V—V of Fig. 6; Fig. 6, is a horizontal section taken on the line VI—VI of Fig. 5; Fig. 7, is a diagrammatical plan of the scenitorium illustrating the operation of the wind making apparatus; and Fig. 8 is a vertical diagrammatical view of the scenitorium also illustrating the method of working the wind making apparatus. Fig. 9 is a perspective view of the wave maker; and Fig. 10 a perspective view illustrating movable stages with scenic arrangements thereon and a ship moving on water against the waves which are built up by the combined action of the wave and wind making apparatus. Fig. 11 is a horizontal section of the scenitorium looking up into the fly gallery; and Fig. 12 is a fragmentary sectional view taken on line XII—XII of Fig. 11.

A, in the drawings denotes a spectatorium or building designed and constructed especially for the production and exhibition of scenic effects or spectacular or dramatic performances. This building may of course be of any desired form and dimensions adapted for the purpose but it is preferably provided with a scenic department or scenitorium A' and an auditorium or spectatorium A² of the general form outlined in the drawings.

B denotes the proscenium wall or arch dividing the spectatorium and scenitorium and provided with proscenium opening B'. The proscenium opening may be provided with a proscenium adjuster consisting of a vertically adjustable slide or drop, and two laterally movable slides or doors B², which may be simultaneously adjusted for the purpose of regulating the size of the proscenium opening to meet various requirements. This proscenium adjuster is not claimed herein but forms the subject matter of a separate application filed May 25, 1892, Serial No. 434,290.

C, C, denote a series of movable stages which may be made in any desired shape and fitted to support and carry any scenic arrangements, machinery, property or persons required for any desired exhibition or performance, and which may be provided with casters or rollers so that they can be moved and combined in any desired manner upon the foundation floor of the scenic department of a theater or other similar structure for the production of any desired scenic effect, or for the facilitation of any desired instantaneous modification in the scenic arrangements. These stages may be either sliding or floating, sectional or otherwise, as set forth in separate applications filed May 25, 1892, Serial Nos. 434,293, 434,294 and 434,296. And I do not claim herein the specific construction of either the sliding, floating, sectional, or telescopic stages, which constructions and the specific mechanism for actuating the same are covered by the aforesaid divisional applications.

In the arrangement shown in the present

case the stages C are constructed in the form of segments; their front edges *c*, being concave and their rear edges *c'* convex. These several stages are mounted upon curved tracks D, D, which extend in the arcs of circles across the scenitorium A', each track being provided with as many stages thereon as may be desirable or necessary to produce the desired effect, and each set of stages, together with all its lighting, wind and water effects will be connected with its own set of actuating mechanism, geared to an electric motor, the action of which will be controlled by a switch upon a table in the prompter's alcove located at the desired point to enable one man to handle the switches on the switch board and thereby control all the machinery in the scenitorium, so as to produce by merely touching the proper key any of the scenic effects that may have been determined by the arrangement of the separate sets of machinery or stages in the scenitorium.

C'—C' denote electric motors for propelling the stages. These motors are geared to shafts E (Figs. 5 and 6) on which are secured drums or pulleys *e*, *e'*, over which pass the cables F, F. The drums or pulleys *e*, *e'*, are loosely fitted on the shafts E so as to permit independent rotary movement when disengaged by the clutch devices G, G', of ordinary construction, having the pivoted actuating levers *g*, *g'*, connected to the longitudinally movable parts of the clutch and provided with spring plates *g*², on the free ends thereof which are adapted to be engaged by projecting pins or tappets *i*, *i*, which latter are carried by interiorly screw threaded rings or sleeves I, I, fitted to travel longitudinally without rotation on a screw threaded shaft I' which is geared to the driven shaft E as shown so as to be rotated thereby. The cables F, F, may pass from the pulleys *e*, *e'*, over fixed pulleys *f*, *f*, and thence under similar pulleys *f'*, *f'*, along the curved tracks or guide ways D, D, to fixed pulleys K, K, at the opposite ends of the tracks, and around the latter pulleys back under pulleys *f*² and over pulleys *f*³ to the pulleys *e*, *e'*, so that when the latter pulleys are rotated the cables may be made to travel in either forward or backward direction according to the direction of rotation, for the purpose of moving the stages back and forth upon the tracks.

Between the end pulleys K, K, and *f'*, *f*², the cables are sustained in engagement with guide pulleys *k*, *k*, placed at suitable intervals along the tracks and may be connected to the respective stages or stage sections by pendent arms or gripping devices *d*, of any suitable construction, so that when the cables are moved the stages may be locked thereto and caused to move therewith. The pulleys *e*, *e'*, of the shaft E are of different diameters the pulley *e* being the larger, (or a differential windlass may be employed) so that the stages may move at different rates of speed. It is obvious that other pulleys may be substituted

for the pulleys e, e' , of any desired diameter, so that the stages may be moved at any desired rate of speed in respect to each other, or at the same rate of speed if desired.

5 L, L, denote the masonry or iron or frame work of the building, which is constructed so as to provide water ways or ducts M, and wind conduits N, the former being preferably below the machinery space O, and the latter above
10 the same, for a purpose to be described.

M', M', are water ways or channels extending parallel with the curved tracks D across the scenic department and connecting with
15 water ways or ducts at either side of the building. These channels may be of any approved construction, but are preferably of the form described and shown in an application filed May 25, 1892, Serial No. 434,292, and in-
20 asmuch as as I do not claim in this application the specific construction of the water ways or channels, further description thereof herein is not deemed necessary.

P, P, (Figs. 1 and 9) denote wave makers which may be of the construction illustrated
25 in the last mentioned divisional application, but in this instance I have shown a wave plate p pivoted to a reciprocating frame p' , which works in guide-ways fitted within the chan-
30 nel-bars M' and connected by a pitman rod p^2 with the crank wheel or shaft of an electric motor P' for actuating the wave-plate carriage or frame. By this means, when it is de-
sired to give the effect of waves upon the sur-
35 face of the water contained in the reservoir upon the foundation floor of the scenic de-
partment, (which overspreads said depart-
ment to a depth sufficient to conceal the tracks
40 and water channels supported thereon) the wave maker may be set in motion by the op-
erator or prompter by simply touching the
proper key upon the switch board so as to set
the motor P' in motion and thereupon waves
will be built up as indicated in Fig. 10.

If desired, for the purpose of controlling the
45 direction of the currents of water and the course of the waves upon the surface thereof, the channels connecting with the conduits M
may be provided with suitable gates and suc-
50 tion or forcing apparatus or other means for causing the water to flow from one channel
into another, as indicated by the arrows, in
Fig. 1. To facilitate the production of scenic
effects of this character, I preferably form a
55 gap in the channels M', M', centrally of the scenic department as shown in the last men-
tioned figure, so that while the water is being
forced inwardly through one channel it may
be simultaneously sucked out of any channel
60 at the opposite side of the center of the scenic
department, and thereby currents and waves
or objects floating upon the water may be
made to take a diagonal course across the cen-
tral portion of the scenic department.

Q, Fig. 10 denotes a sailing vessel which is
65 connected to an anchor-block q , fixed to one
of the cables F, so that the vessel may be held
stationary or drawn forward or back at will

by the motor-actuating mechanism of one of
the sets of stages.

R, R, (Figs. 1 and 4) denote current makers, 70
which may consist of spiral blades or Archi-
medean screws journaled in suitable supports
fixed within the channels M' near the ends
thereof, and geared to electric or other suit-
75 able motors R', by belts and pulleys m, m' , or
other suitable gearing, whereby a rotary mo-
tion may be imparted to the blades for the
purpose of forcing the water through the chan-
nels and thereby producing currents.

S denotes a fan or air forcing apparatus 80
which may be geared to an electric motor and
is fitted in the dome of the scenic department
for the purpose of forcing air into the same
or exhausting the air therefrom, and co-oper-
85 ating with similar fans or air forcing appara-
tuses S', S', located at the sides or ends of the
scenic department in communication with the
ducts or conduits N, so that the air may be
forced into or drawn out of the scenic depart-
90 ment at either end or side, or at the apex
thereof, for the purpose of forming currents
of air and producing the effect of a gale of
wind blowing in either direction, and de-
scending or ascending, or moving in a rotary
95 course in and about the scenic department, so
as to give the effect of a stiff gale, a hurricane
or cyclone. These latter effects may be ac-
companied by thunder and lightning and rain
or other storm effects, so as to imitate nature
100 in its most violent aspects upon both land
and sea.

S², S², denote electric motors for propelling
the fans S'.

The mouths or exit ends of the conduits N,
N, are provided with flexible tubes N', which 105
are preferably formed in telescopic sections,
as shown clearly in Fig. 3, to permit the air
currents to be guided in any desired direc-
tion within the scenic department, by shift-
110 ing the free ends of the flexible tubes. These
flexible tubes are preferably provided with
ropes or cables n , by which they may be sus-
pended at any proper height, and with oper-
ating cords or cables n' which may be ma-
115 nipulated by hand or connected to a crank
wheel or axle for the purpose of shifting and
setting the tubes in the desired position.

N², denotes slides or doors controlling ports
or openings for the admission of air or the ex-
120 haust thereof at either side of the scenic de-
partment, in proximity to the fans.

The operation of the wind making appara-
tus is illustrated diagrammatically in Figs. 7
and 8, of the drawings, wherein the arrows in-
125 dicate the course of the currents passing from
the duct N, into and through the fans at the
sides of the scenitorium and out at the top or
dome thereof.

Two or more fans and as many flexible tubes
as may be desired may be provided at each 130
side of the scenitorium as indicated in Fig. 7.
By these means air currents may be directed
in such manner as to produce almost every
conceivable effect, of a stiff or light breeze, a

gale, a hurricane, or a cyclone, accompanied or not, as may be deemed expedient, with various other scenic effects representing rain, hail or snow and thunder and lightning.

5 T, T, denote stage illuminating devices consisting of apparatus which I term an illuminoscope and colorator and which are specially designed for the improvement of scenic illumination and the increase of realism in the
10 imitation of the shades and tints of light which color the landscape, permitting the imitation of the tints of the hours to be produced, completely, or in part, and facilitating the passage and blending of these tints
15 each into the other so as to illustrate the slow progress of the hours throughout the day or night. These devices may be of any suitable construction adapted for the purpose. In the form shown they consist of a rotary drum
20 or series of drums covered with a variously colored transparent substance through which the light from a lamp within the drum may pass onto the surface or object to be illuminated, together with mechanism for causing
25 the variously colored portions of such substance to pass successively between the light and the sky foundation or surface on which the rays of light may fall. But I do not make any claim herein to the specific construction
30 shown, as the same forms the subject matter of a separate application filed May 25, 1892, Serial No. 434,291.

In Fig. 11 of the drawings is shown a series of drums connected by bevel gearing so as to
35 produce simultaneous rotary movement of the several drums; the end drums in each series being geared to a worm shaft engaging worm wheels on the drum shafts or spindles, and the latter shafts being connected
40 by a band or belt with a band wheel or pulley on the driven shaft of a rotary engine or electric motor; such motor being controlled by a switch upon a common switch board in the prompter's alcove, so as to place the illuminating devices under the control of a single operator.
45

U, U, denote a series of cloud creators, which I term nebulators, and which consist essentially of an apparatus designed to produce the appearance of clouds moving through
50 the sky so as to give the effect upon the sky foundation or other surface of a cloud rising above the horizon or descending the sky, and passing in the desired direction and at the desired rate of speed, while gradually increasing or decreasing in size as it rises or descends below the horizon. A simple form of the device consists of a piece or sheet of netting, cloth or other suitable material of a
60 transparent or semi-transparent nature, on which the desired cloud forms or effects may be placed, by painting or otherwise, and which is secured to a sliding frame adapted to move laterally and vertically in an oblique direction, so as to give the appearance of a gradually rising or descending cloud, which may

approach or recede from the observer as it rises or descends; such apparatus forming the subject-matter of a separate application filed May 25, 1892, Serial No. 434,289. 70

V, V, denote a series of cloud shadow makers which I term umbrators and which may be arranged horizontally in proximity to the "nebulators" and beneath the colorators or illuminating devices so as to give the effect
75 of cloud shadows moving across the landscape or scenic arrangements, or objects supported upon and carried by the movable stages, which are adapted to traverse the foundation floor of the scenic department and produce such
80 scenic effects, either moving or stationary, as may be determined upon, and in connection with which it may be desirable to give the effect of cloud shadows moving thereover or thereupon. These umbrators may consist
85 simply of sliding frames with cloth or netting secured thereto and on which may be placed by painting or otherwise, the cloud shadows. As the clouds or cloud shadows produced by the nebulators and umbrators move across
90 the landscape or scenic arrangement, the coloring effects may also be produced by the passage of light from the interior of the coloring drums through the variously colored transparent material thereon, so as to give the desired tint or shade to the scenic arrangements simultaneously with the passage of the clouds or cloud shadows over the same. 95

W, W, denote rain makers and Y, Y, fog makers which may be supported or suspended
100 from the fly gallery below the illuminating devices and in front of the umbrators and nebulators so as to prevent interference with the operations of the latter. The rain producers may consist simply of a series of perforated pipes connected to a water supply pipe *w*, and provided with suitable cocks or valves *w'*, by which the water may be turned off or on so as to circulate through said pipes and pass through the perforations therein
105 upon the scenic department so as to give the effect of a gentle shower or a drenching rain. The fog producers may consist of any suitable receptacle in the form of a trough *y*, having an open top above which is suspended by
110 weights, cords and pulleys a perforated receptacle *y'*, having a sliding or hinged top and containing quick-lime which may be lowered into the water for the purpose of slaking the lime and thus forming the fog. The
115 fog thus produced may be precipitated and caused to completely or partly envelop the scenic arrangements, so as to give the effect of a light or a dense fog, and by means of the wind making apparatus this fog may be caused
120 to gently rise or descend or be suddenly lifted or dissipated. 125

Z, Z, denote masking borders or drops suspended from the fly gallery in position to screen the several illuminating devices and
130 cloud, rain, and fog making apparatuses, which latter are supported from the fly gal-

lery or suspended from the framing supporting the superstructure in position to be raised and lowered when desired, so that any one or more of the series or independent sets of illuminating and weather making apparatuses may be used in connection with any scenic arrangement upon the stage or stages.

Z' denotes what I term a luxauleator which may consist of a series of electric or other suitable lamps z' , bordering or encircling the proscenium opening and which are set in backings or reflectors z^2 , so as to screen the light from the scenitorium or space in rear of the proscenium opening and flood the opposite space with light, thereby forming in effect a vivid curtain or screen of light which is adapted to intercept all sight of anything placed in the shaded portion of space and to displace the usual drop scenes employed in theaters for closing the proscenium opening. I make no claim, however, in this application to the luxauleator, as the same forms the subject-matter of a separate application filed May 25, 1892, Serial No. 434,295.

The operation of my invention will be readily understood from the foregoing description. The scenic effect which it is desired to produce having been previously determined, and the stage or stages provided with the desired scenic arrangements, property or persons, thereon such stage or stages may be set in motion and caused to move in front or across the space back of the proscenium opening at any desired rate of speed; two or more stages being made to move at the same or at different rates of speed, for the production of perspective or other moving scenic effects, and simultaneously with the movement of the stage or stages in the desired order, or the placing of the same with the scenic arrangements thereon in the desired position to be exposed to the view of the audience, the machinery controlling the wind producing apparatus, or the water current and wave makers, or the rain and fog producers, may one or all be set in motion and so controlled as to give the effect of a beautifully colored landscape, or of ships moving to and fro upon the bosom of the ocean, and rolling and tossing upon the sea, of light houses, reefs, &c., and various objects moving at the same or at different rates of speed so as to give the perspective effect due to the movements of near and distant objects traveling at different speeds which the same would present to the eye of an observer stationed at a particular point. And by properly manipulating the various wave, wind, water, fog, rain and illuminating and coloring devices, all the various effects of a clear cloudless sky, a cloudy gloomy sky, or of a rough and stormy day on either land or at sea, with the various storm effects peculiar to the location on land or water may be produced, simultaneously with the exhibition of the scenery, objects, persons, or whatever may be desired upon the

stages, while the latter are either at rest or in motion. By means of the fog and wind making apparatus the effect may be given of a fog as it appears floating above the earth's surface, or gradually rising or falling, or the fog may be suddenly lifted and quickly dissipated. In the same manner the falling rain and snow may be so controlled as to give the various effects of a drifting snow, or a terrific storm, the rain being accompanied if desired with thunder and lightning. And in addition to these weather making effects, the cloud creating and shadow making devices, together with the illuminating and coloring drums may be utilized to produce or imitate all the effects which nature portrays in the wake of a storm. By the co-action of the wind making and wave making apparatus, the latter building up or forming the waves against the force of the wind, as indicated by the arrows in Fig. 10, waves may be built up and the effect of a tempest tossed vessel produced.

It will be understood that the various apparatus may be operated in any suitable manner, and while I preferably employ electric motors as the propelling force or source of power any suitable source may be employed.

It will also be understood that various modifications may be made in the construction and arrangement of parts shown and described herein without departing from the spirit of my invention, and while I have illustrated preferred forms of apparatus for making the various combinations for the attainment of any desired scenic effect, other forms may be substituted, and similar results produced without adhering to the specific form or arrangement described and shown, and my invention is not limited to the specific constructions specified in forming the various combinations.

Heretofore bicycle-supporting carriages have been mounted on the stage of a theater and provided with means for moving the same along the stage with persons mounted on the bicycles so as to produce the illusory effect of a race between the riders of the bicycles; and I make no claim to such apparatus. I propose to move the stages themselves bodily with various scenic arrangements thereon for the purpose of producing various scenic effects; the moving scenic effect of whatever nature previously determined being produced by effecting the desired arrangement and then causing the stages to move in the desired direction upon the foundation floor of the scenic department; the stages being adapted to move in the same or in opposite directions and at the same or at different rates of speed.

Having thus fully described my invention what I claim as new and desire to secure by Letters Patent of the United States, is:—

1. In combination with the scenic department of a theater or other similar structure, two or more movable stages adapted to support the scenic arrangements for various

scenic performances and propelling mechanism for effecting the movements of the stages so as to produce the desired moving scenic effect, substantially as and for the purpose set forth.

2. In combination with the scenic department of a theater or other similar structure, a series of curved tracks, movable stages mounted on said tracks and provided with the desired scenic arrangements thereon, and mechanism for propelling the stages to and fro upon the tracks so as to produce the desired scenic effect, substantially as described.

3. In combination with the scenic department of a theater or other similar structure, a series of curved tracks or guide ways, a corresponding series of movable stages constructed in the form of segments mounted on said tracks, and means for moving the stages with any desired scenic arrangement, persons or objects thereon, for the purpose of producing scenic effects substantially as described.

4. In combination with the scenic department of a theater or other similar structure, a series of curved tracks or guide ways, a similar series of independently movable stages constructed in the form of segments mounted on said tracks and supporting the scenic arrangements, and mechanism for automatically moving the stages so as to produce the desired scenic effect, substantially as described.

5. As a means for producing scenic effects, the combination of two or more movable stages and mechanism for moving the two stages simultaneously at different rates of speed so as to produce the desired perspective or other moving scenic effect, substantially as described.

6. The combination with the scenic department of a theater or similar structure, of two or more independently movable stages, and means for moving the same simultaneously at different rates of speed for the purpose of producing the desired perspective or other moving scenic effect, substantially as described.

7. The combination with the scenic department of a theater or similar structure adapted for producing scenic effects of movable stages for supporting the scenic arrangements, and a wind making apparatus and means for controlling the direction of the air currents produced by such apparatus for the purpose of producing various wind-storm effects, substantially as described.

8. The combination with the movable stages supporting the desired scenic arrangements of the scenic department of a theater or similar structure, of the wind maker comprising an air forcing apparatus communicating with suitable ducts or air inlets at either side or end of the scenic department, substantially as described.

9. The combination with the scenitorium provided with air ducts or inlets at either side or end thereof, and air forcing apparatus con-

nected therewith, of an air forcing apparatus centrally disposed above the side or end apparatuses, and means for controlling the direction of the air currents issuing from the latter apparatuses, whereby various wind-storm effects may be produced, substantially as described.

10. In combination with the scenitorium, a series of movable stages adapted to support the scenic arrangements, means for moving said stages in the same or opposite directions at any desired rate of speed, and a wind making apparatus, whereby wind-storm effects may be produced simultaneously with the exhibition of the scenic effect, substantially as described.

11. The combination of the scenitorium provided with air ducts or inlets at either side or end thereof, air forcing apparatus connected therewith, and means for controlling the direction of the air currents produced by such apparatus, substantially as described.

12. The combination with the scenitorium provided with the water reservoir, of the water current maker and the wind making apparatus, substantially as described.

13. The combination with the scenitorium, provided with the reservoir, of the water current maker, the wind maker, and the wave maker, substantially as described.

14. The combination with the scenitorium provided with the water reservoir, of the water current maker and the wave maker, substantially as described.

15. The combination with the scenitorium provided with the water reservoir of the water channels leading through said reservoir, the wave maker and the wind making apparatus, adapted to build up the waves, substantially as described.

16. The combination with the scenitorium provided with the water reservoir, of the movable stages supported thereon, and the water current maker, substantially as described.

17. The combination with the scenitorium provided with the water reservoir, of the movable stages supported thereon, means for moving said stages, and the wave maker, substantially as described.

18. The combination with the scenitorium provided with the water reservoir, of the movable stages, the water current maker and the wave maker, substantially as described.

19. The combination with the scenitorium provided with the reservoir, of the movable stages supporting the scenic arrangements, the wave maker, and the wind making apparatus, substantially as described.

20. In combination with the movable stages having the scenic arrangements supported thereon substantially as described and mechanism for moving the stages, the apparatus for producing cloud effects or cloud shadows, so as to give the effect of clouds or cloud-shadows moving over the landscape or scenic arrangements substantially as described.

21. In combination with the movable stages

substantially as described having the desired scenic arrangements placed thereon, mechanism for actuating the stages, and the mechanically actuated cloud creator or nebulator, substantially as described.

22. In combination with the movable stages substantially as described having the desired scenic arrangements placed thereon, and mechanism for actuating the same, the nebulator, and the illuminating and coloring devices, substantially as described.

23. In combination with the movable stages substantially as described and mechanism for actuating the same, the nebulator, the umbrellator, and the illuminating and coloring devices, substantially as described.

24. In combination with the scenitorium provided with the water reservoir, a series of movable stages, mechanism for actuating the same, a wave maker, and an illuminating and coloring device, substantially as described.

25. In combination with the scenitorium provided with the water reservoir, a series of movable stages, mechanism for actuating the same, a wave maker, and a wind making apparatus, substantially as described.

26. In combination with the scenitorium provided with the water reservoir, a series of movable stages, mechanism for actuating the same, a wave maker, a wind making apparatus, and means for controlling the direction of motion of the air currents produced by such wind making apparatus, substantially as described.

27. In combination with the water reservoir, the movable stages, the wave maker, the wind making apparatus and the illuminating and coloring devices, and actuating mechanism substantially as described.

28. In combination with the scenitorium provided with the air ducts, the air inlets, the slides controlling said inlets and the air forcing apparatus whereby currents of air may be produced and caused to pass through said ducts or directed into or out of the interior of the scenic department for the purpose of producing various wind-storm effects, substantially as described.

29. In combination with the scenic department of a theater or similar structure, an air forcing apparatus, and a flexible combined inlet and outlet tube for controlling the direction of motion of the air currents, substantially as described.

30. In combination with the scenic department of a theater or similar structure, an air forcing apparatus and a flexible telescopic combined inlet and outlet tube for controlling the direction of motion of the air currents, substantially as described.

31. In combination with the scenic department of a theater or similar structure, a wind making apparatus comprising a series of fans located at the sides or ends of the scenic department, air inlets communicating with said fans, movable slides controlling said inlets, flexible tubes connected with said fans, and

an auxiliary fan located in the dome of the scenitorium, whereby various wind storm effects may be produced, substantially as described.

32. In combination with the scenic department of a theater or similar structure, a fog making apparatus, and a wind making apparatus co-operating with the fog maker for the purpose of lifting or dissipating the fog, substantially as described.

33. In combination with the scenic department of a theater or similar structure, a rain making apparatus and a wind making apparatus and means for controlling the rain-fall and the direction of motion of the wind, for the purpose of producing rain and wind storm effects, substantially as described.

34. In combination with the scenic department of a theater or other similar structure, a wind making apparatus, a rain making apparatus, and an illuminating and coloring device, substantially as described.

35. In combination with the scenic department of a theater or similar structure, provided with the water reservoir and conduits connecting therewith, the current makers and the water channels leading from said conduits, and having the gap therein intermediate the scenic department, substantially as and for the purpose set forth.

36. In combination with the movable stages, the operating mechanism therefor comprising the cables and means for connecting the stages thereto, the driven shaft having the loose pulleys thereon, over which cables work and means for causing said pulleys to rotate with the shaft at will, so as to impart motion to the stages substantially as described.

37. In combination with the movable stages, the operating mechanism therefor comprising the cables and means for connecting the stages thereto, the driven shaft having loose pulleys of different diameters thereon, over which said cables work and means for causing said pulleys to rotate with the shaft at will so as to impart motion to the cables and thereby cause the stages to move at different rates of speed, substantially as described.

38. In combination with two or more movable stages, and mechanism for propelling the same, independently of each other means for effecting the initial movement of one or more of the stages at a certain predetermined point in the movement of a preceding stage or stages whereby the several stages are adapted to move at intervals in regular order of succession so as to produce the desired moving scenic effect, substantially as described.

39. In combination with the movable stages, the cables, the guide pulleys, the driven shaft provided with loose pulleys and clutch couplings for causing said pulleys to rotate with the shaft, and the screw shaft geared to said driven shaft and provided with the traveling tappets for engaging and disengaging said clutch couplings, substantially as described.

40. In apparatus for producing scenic ef-

fects, the fog maker, comprising the water
tank or trough, the perforated receptacle sus-
pended above the open top of said trough, and
means for raising and lowering said recepta-
5 cle and sustaining the same in the desired
position above the trough, substantially as de-
scribed.

In testimony whereof I affix my signature in
presence of two witnesses.

STEELE MACKAYE.

Witnesses:

CHARLES O. HENTHORN,
SIDNEY C. WHITE, Jr.