BEST AVAILABLE COPY

Apr. 3, 1923. 1,450,263

M. SCHIESARI

APPARATUS FOR AERIAL PROJECTION

Filed Mar. 15, 1921 6 sheets-sheet 1

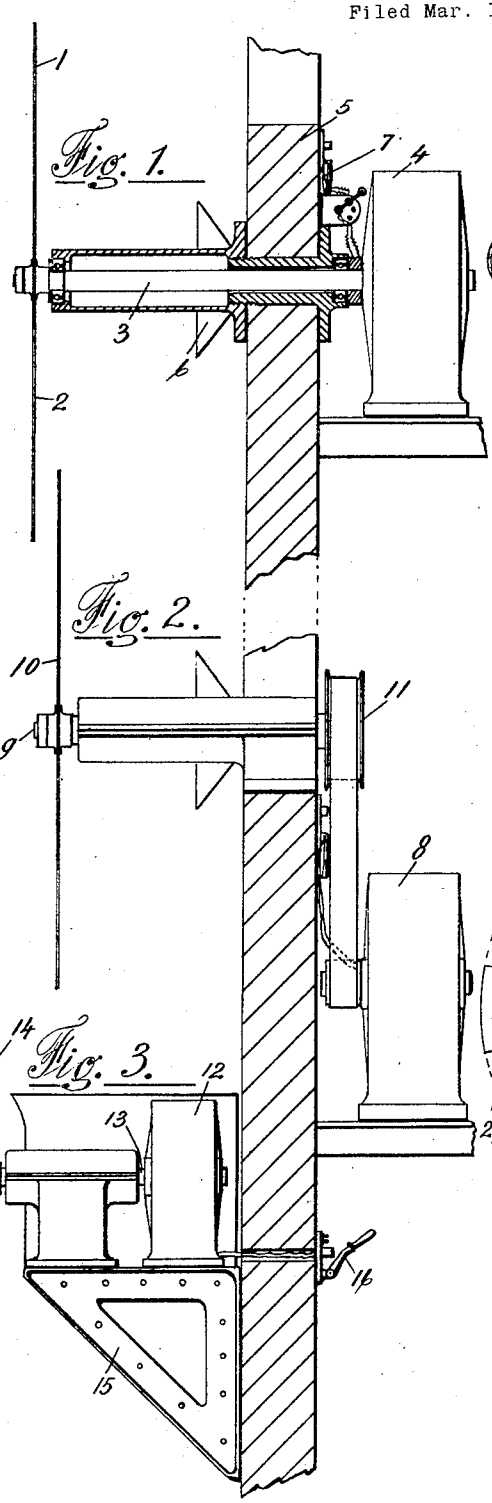


Fig. 1.

Fig. 2.

Fig. 3.

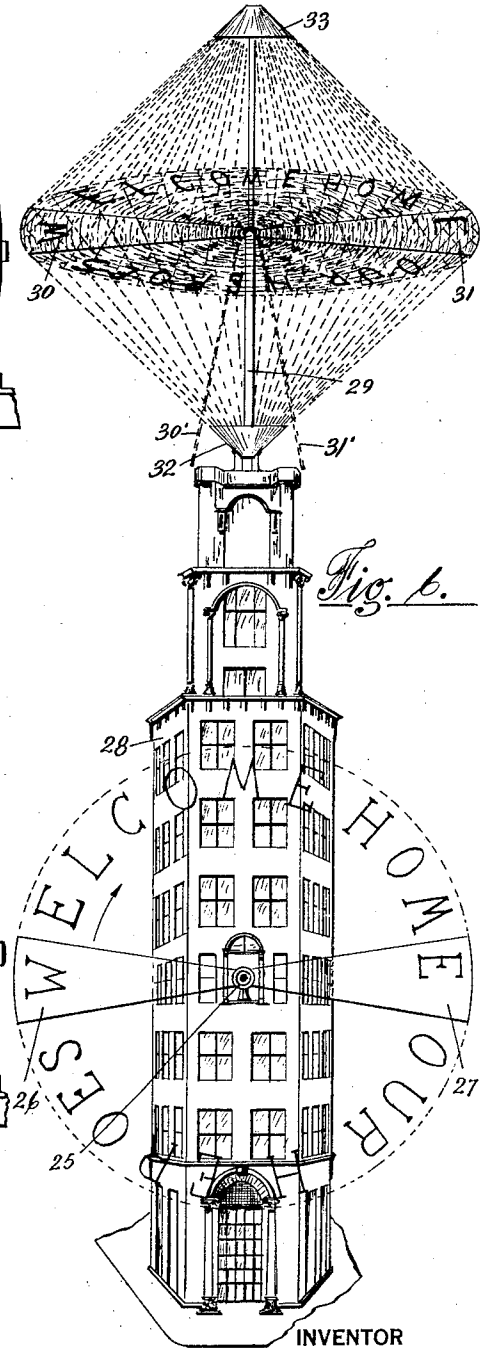


Fig. 4.

INVENTOR

Mario Schiesari

BEST AVAILABLE COPY

Apr. 3, 1923. 1,450,263

M. SCHIESARI

APPARATUS FOR AERIAL PROJECTION

Filed Mar. 15, 1921 6 sheets-sheet 2

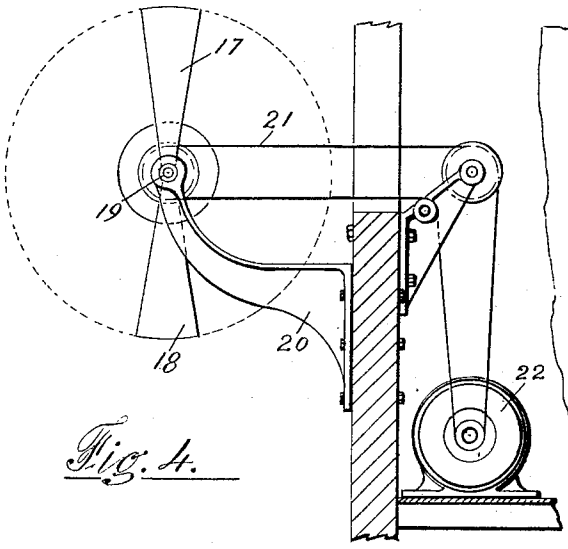


Fig. 4.

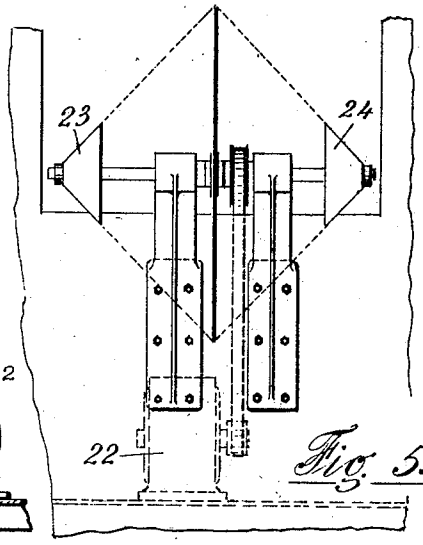


Fig. 5.

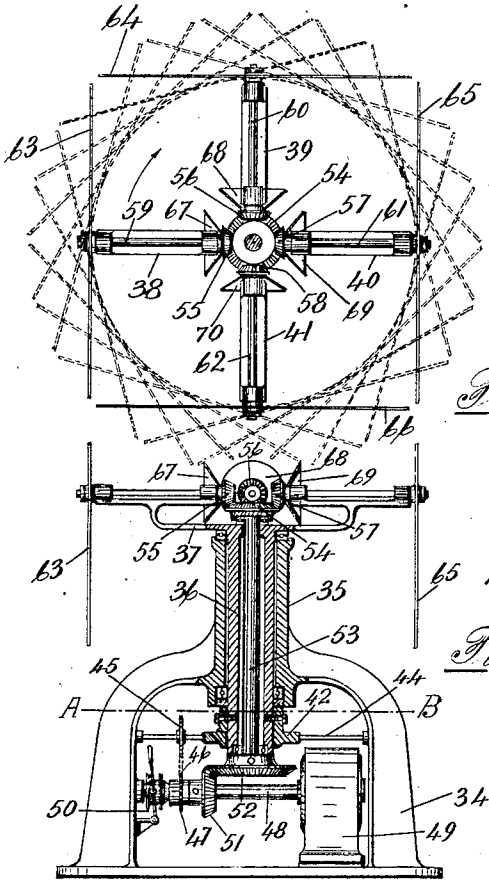


Fig. 8.

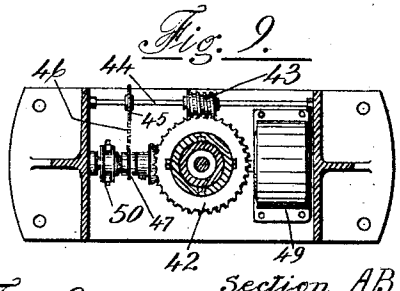


Fig. 9.

Section AB

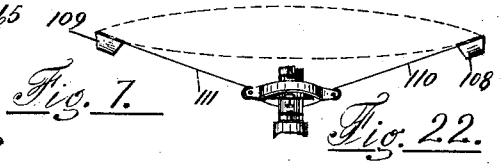


Fig. 7.

Fig. 22.

INVENTOR

Mario Schiesari

BEST AVAILABLE COPY

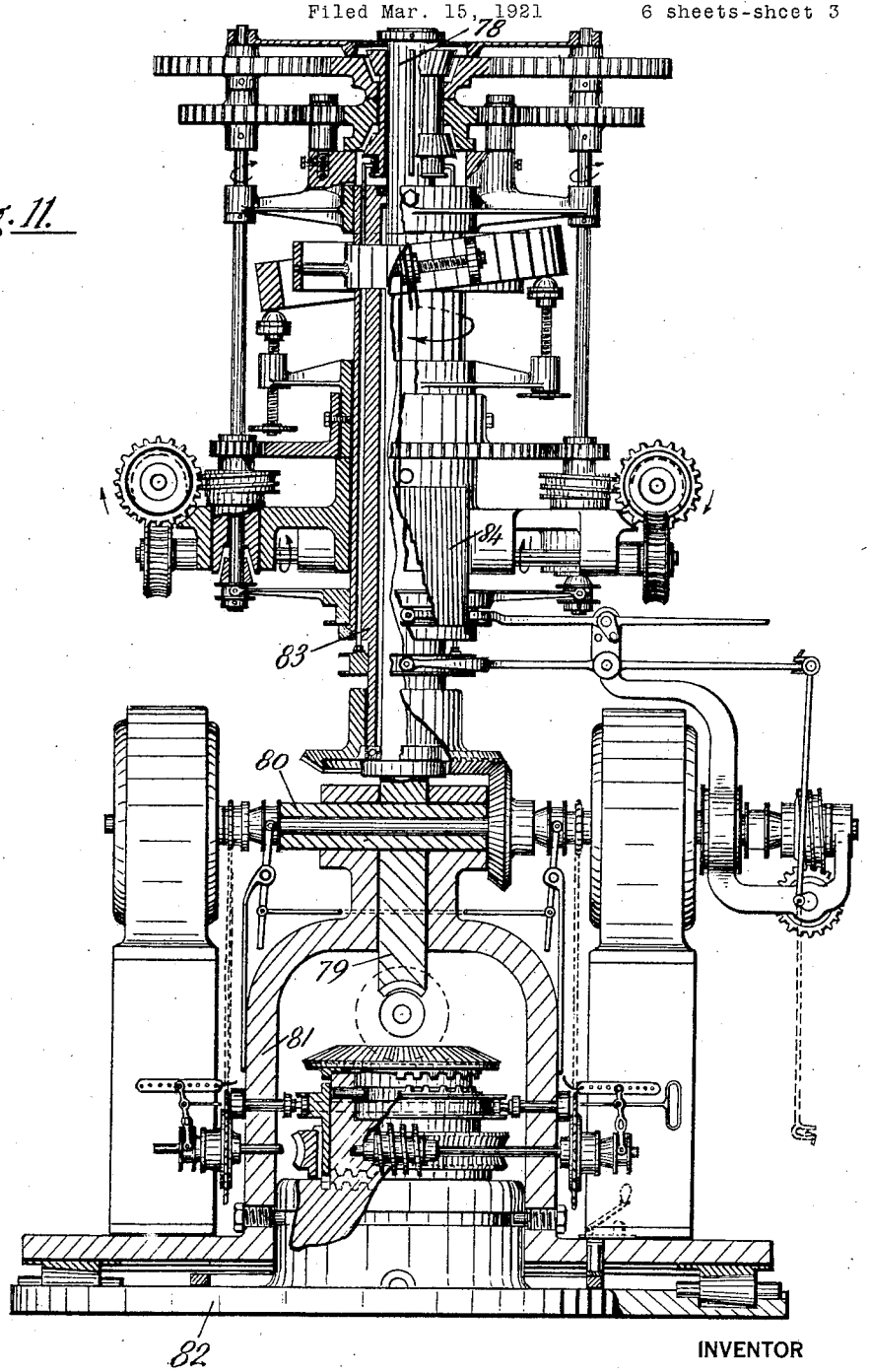
Apr. 3, 1923. 1,450,263

M. SCHIESARI

APPARATUS FOR AERIAL PROJECTION

Filed Mar. 15, 1921 6 sheets-sheet 3

Fig. 11.



INVENTOR

Mario Schiesari

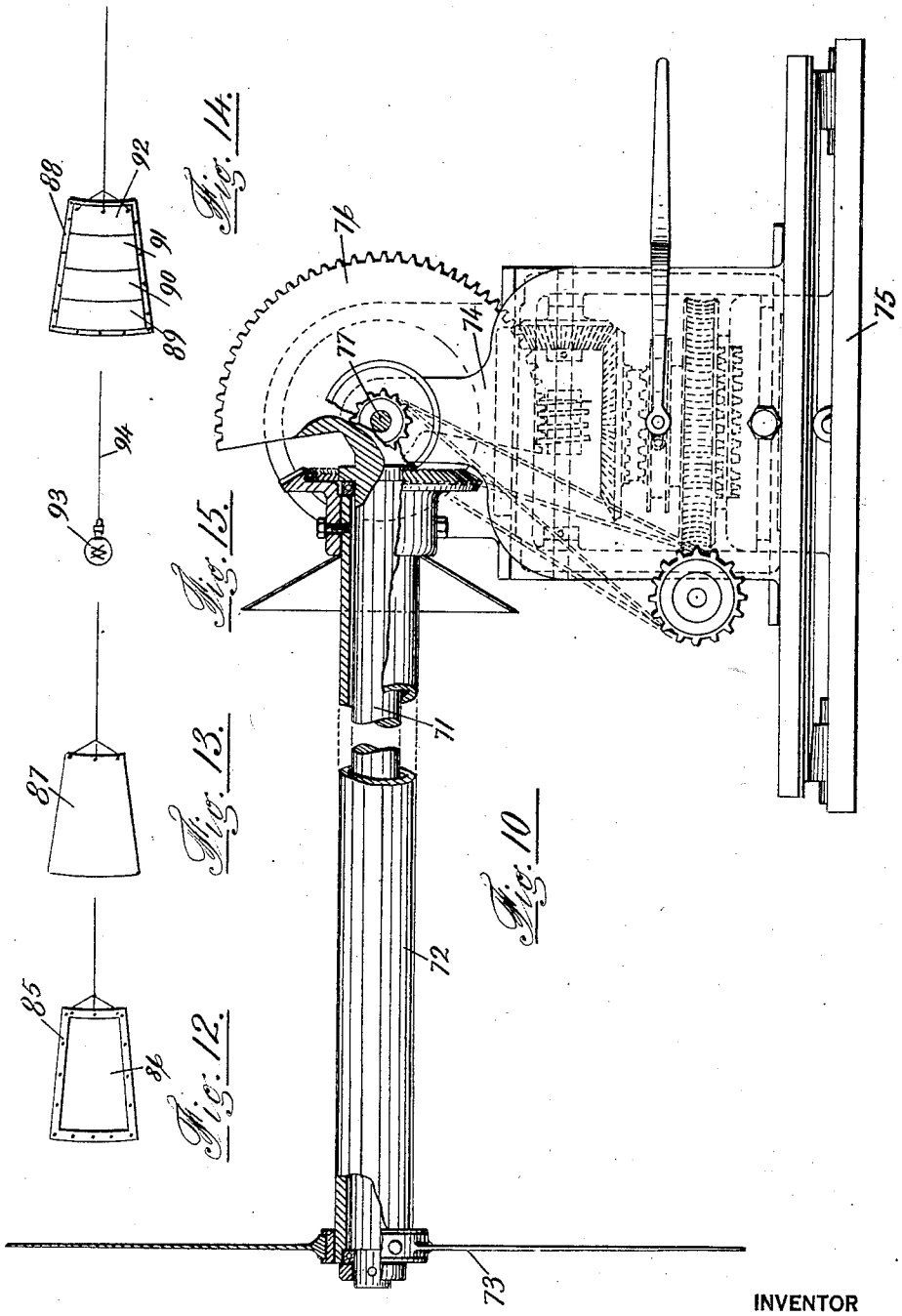
BEST AVAILABLE COPY

Apr. 3, 1923. **1,450,263**

M. SCHIESARI

APPARATUS FOR AERIAL PROJECTION

Filed Mar. 15, 1921 6 sheets-sheet 4



INVENTOR

Mario Schiesari

BEST AVAILABLE COPY

Apr. 3, 1923. 1,450,263

M. SCHIESARI

APPARATUS FOR AERIAL PROJECTION

Filed Mar. 15, 1921 6 sheets-sheet 5

Fig. 19.

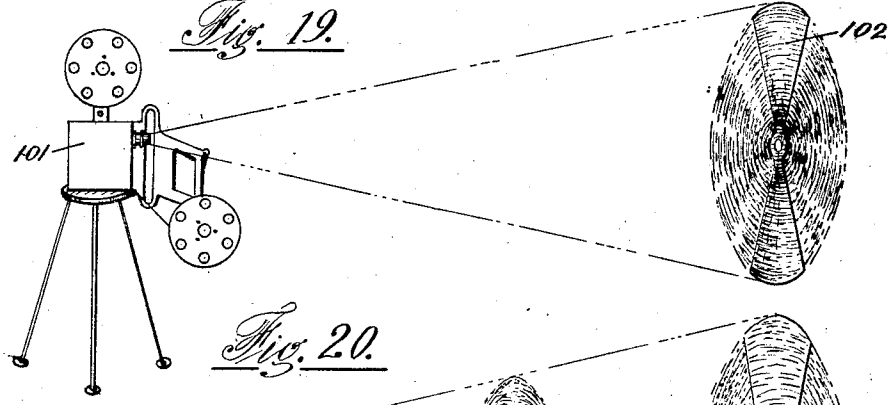


Fig. 20.

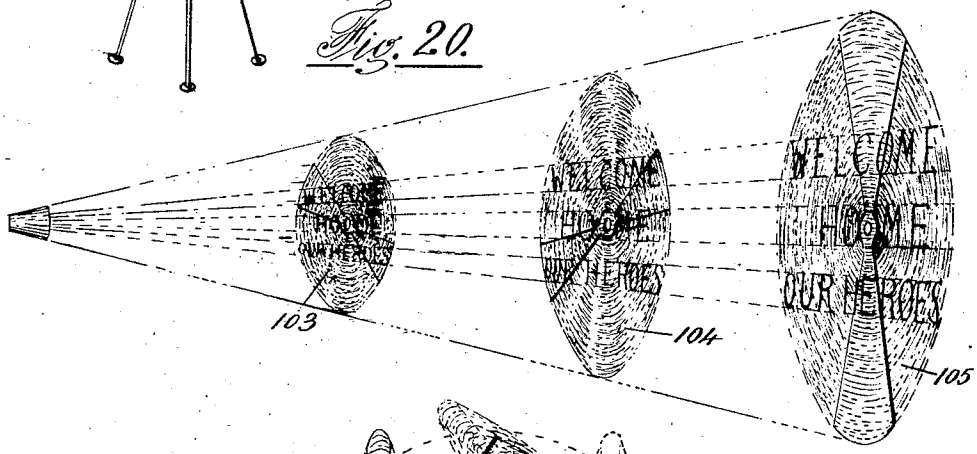


Fig. 18.

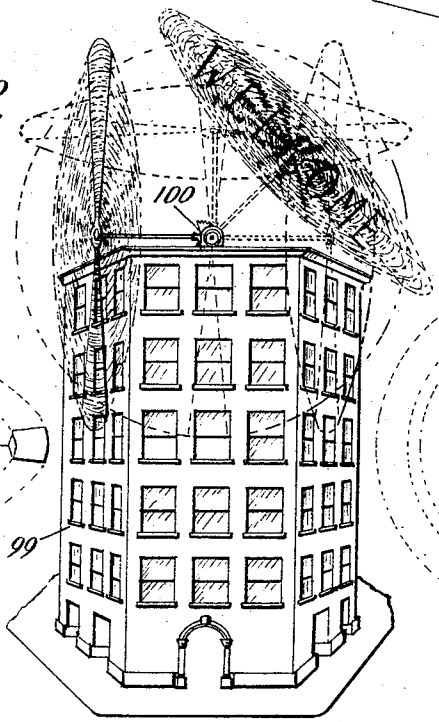


Fig. 17.

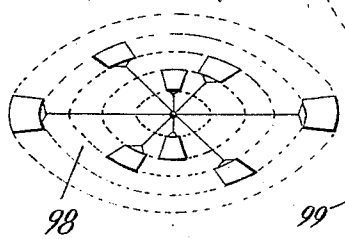
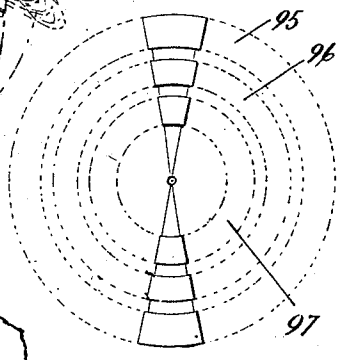


Fig. 16.



INVENTOR

Mario Schiesari

BEST AVAILABLE COPY

Apr. 3, 1923. 1,450,263

M. SCHIESARI

APPARATUS FOR AERIAL PROJECTION

Filed Mar. 15, 1921 6 sheets-sheet 6

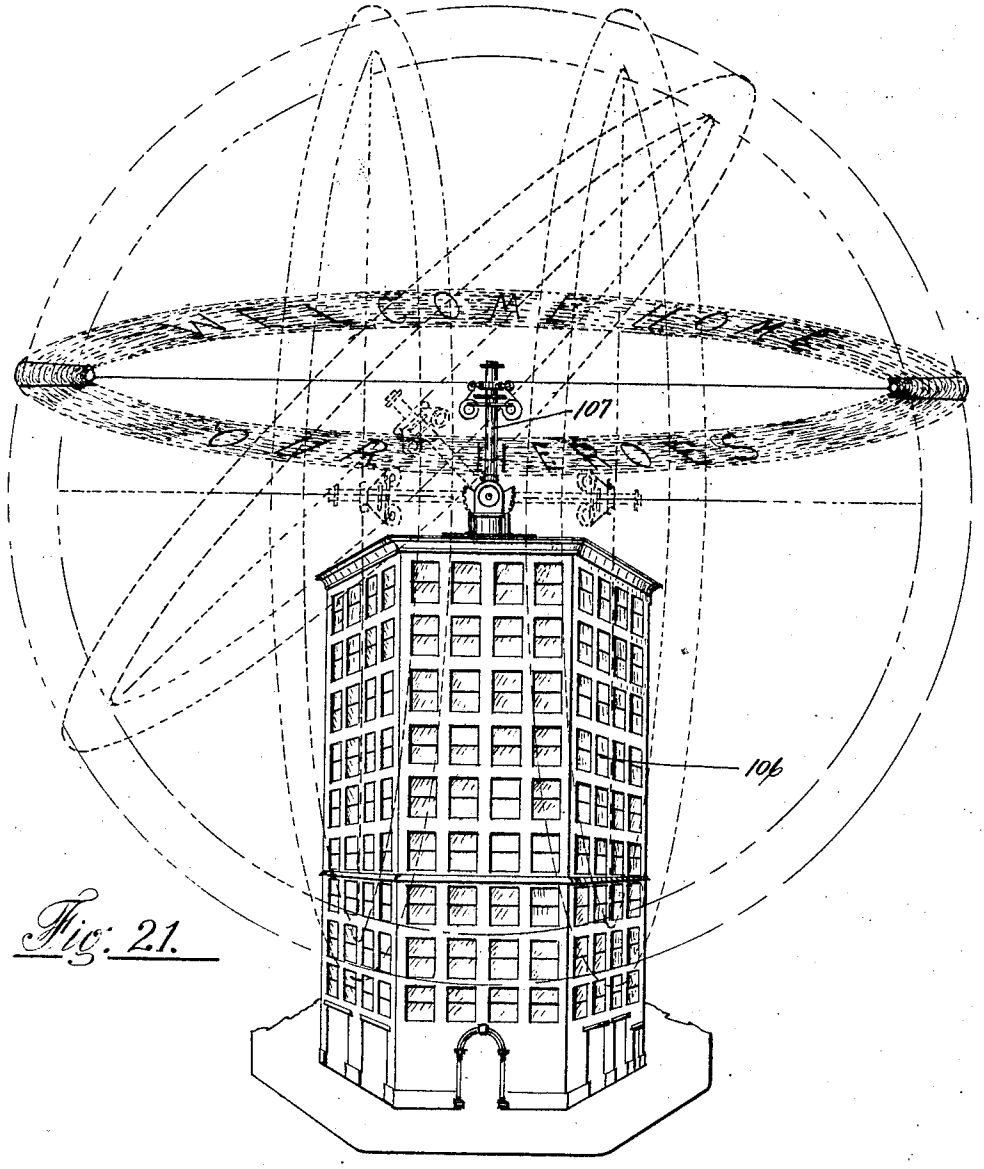


Fig. 21.

INVENTOR
Mario Schiesari

BEST AVAILABLE COPY

Patented Apr. 3, 1923. 1,450,263

UNITED STATES PATENT OFFICE.

MARIO SCHIESARI, OF NEW YORK, N. Y.

APPARATUS FOR AERIAL PROJECTION.

Application filed March 15, 1921. Serial No. 452,540.

To all whom it may concern:

Be it known that I, MARIO SCHIESARI, a citizen of the United States, residing in the borough of Manhattan, city of New York, county of New York, and State of New York, have invented certain new and useful Improvements in Apparatus for Aerial Projection, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to a novel method and apparatus for producing aerial projections, lights, signals, advertisements, pictures, etc.; and more particularly for producing an entirely novel type of screen, making it possible to obtain novel effects in projection, both as regards size and location doing away with the necessity of building heavy and expensive frame works.

The main object of this invention is to provide a novel method whereby projections may be obtained on screens created and supported through the air in a special manner and which may be of considerable dimensions and occupying locations which would be out of reach of the present construction methods.

A further object of this invention is to provide a novel type of screen which may be used for rendering visible images, signals, etc., projected through the air and which may assume large dimensions without requiring, however, the construction of heavy and expensive framework and not obstructing the light of the building or structure on which the same is mounted.

A still further object is to provide a screen built on an entirely novel principle, on which pictures, advertisements, etc., can be projected and which may be used for a number of purposes for which the ordinary types of screens are not suitable.

With these and other objects in view as will more fully appear as the description proceeds, this invention consists of certain novel arrangements of parts as will be hereinafter fully described and claimed in the appended claims.

My invention is based on the optical illusion created by a radially extending surface rapidly revolving around its center, which causes the eye to see a solid disk while in reality only a portion of said disk is there. Through the same phenomenon the wheels of an automobile run at very high speed appear like semitransparent disks, while in reality they consist of a number of spokes separated from each other. This optical illusion is due to the permanency of images on the retina of the human eye which has been estimated to last in the average person about $\frac{1}{24}$ of a second. Through the same cause if a luminous point, like for instance an incandescent carbon is rapidly rotated the eye will receive the illusion of an uninterrupted circle of light. This illusion is due to the impression that the image of a moving body on the retina persists for about $\frac{1}{24}$ of a second after the body itself has disappeared or has moved a certain space. The impression of continuity of motion which is obtained in moving pictures is due to the same cause as well as the well-known physical demonstration of blending of different colors which is obtained through the rapid rotation of a disk having radial portions painted in different colors. For instance if the disk is painted blue and yellow a green surface will be produced; blue and red will produce purple, and the seven fundamental colors will produce a white surface.

In the same manner I create a circular screen through a rapid rotation of a blade or blades or segments adapted to create an impression on the retina with a frequency of not less than $\frac{1}{24}$ of a second; for instance if the revolving surface is constituted by two opposite radially extending segments, in order to produce the illusion of a solid disk it will be sufficient that same be rotated at not less than seven hundred and twenty revolutions per minute. A good illustration of an elementary form which may be assumed by my revolving screen is given for instance by a rapidly rotating aeroplane propeller.

By thus producing the impression of a solid or annular disk I will at the same time have created a screen on which permanent or animated images may be projected; so that a vast field for producing novel effects in advertising, aeroplane signalling, etc., is rendered available.

A revolving screen built on the above mentioned principle is possessed of many peculiar advantages, among which may be mentioned the following: 1, the possibility of obtaining a large surface of projection without the necessity of erecting cumbersome and expensive framework, such as required by present methods in order to make

 BEST AVAILABLE COPY

the structure sufficiently strong to resist wind pressure. The same remark applies to the possibility of creating horizontal projection surfaces adapted to give the impression of projections through the air on surfaces having no visible means of support.

2. The possibility of producing a vertical screen in front of a building without obstructing the light to the building itself and without obstructing the line of vision from the building. It will thus be possible to see the projection and at the same time to see the building back of it. Another important advantage of such a type of screen is that since in most cases it will only be practical to make projections on the same at night, when the device is maintained stationary during the day it will be inconspicuous and will not detract from the appearance of the building or structure on which the same is mounted to any noticeable extent.

3. Another advantage is the possibility of adjusting the revolving screen so as to bring the same in different planes or to create a variety of motions in the same by means of oscillating or rotating devices which will permit of obtaining novel and startling effects. By having the rotating surface attached to extensible carriers, the diameter of the screen produced may also be made larger or smaller at will.

4. The momentum of the rotating body renders the same better adapted to resist wind pressure than a stationary screen.

5. The possibility of producing the same projection on a series of coaxial screens located at a distance from each other.

6. The possibility of creating the optical illusion of inscriptions or images in the air obtained not through projections, but through portions of said inscriptions or images separately carried through the air by the carriers and producing the optical illusion of the inscription or image recomposed in its entirety.

In another patent application filed simultaneously herewith and having for title "Method and apparatus for utilization of centrifugal force" I have described a novel method and apparatus whereby various devices may be caused to rotate through the air within adjustable radii and on different planes according to the type of apparatus used; and it may be here stated that the general type of apparatus described therein, fitted with screen segments at the end of collapsible carriers is well suited for application in connection with my present invention.

In the drawings I illustrate a few devices whereby my invention may be carried into practice and also illustrate some possible applications of my invention for advertising or signalling purposes. Referring to same:

Figs. 1, 2, 3 and 4 are side views in elevation partly sectioned of four elementary forms of a device for operating a revolving screen;

Fig. 5 is a front view in elevation of the device shown in Fig. 4;

Fig. 6 is a front view in elevation of a building showing the application of my invention on the front of the building and on its top;

Figs. 7 and 8 are respectively a front view in elevation partly sectioned and a plan view of another device designed for carrying my invention into practice;

Fig. 9 is a plan sectional view of the same through line A—B of Fig. 7;

Fig. 10 is a side view in elevation partly broken away of a universal type of machine for operating non-extensible screens;

Fig. 11 is a front view in elevation partly broken away of a universal type of machine for operating screens of the extensible type;

Figs. 12, 13 and 14 are detail plan views of different forms of screens;

Fig. 15 is a detail plan view of an electric bulb attached in place of a screen;

Figs. 16, 17 are respectively a detail plan view and a detail view in perspective of two different arrangements of screens;

Fig. 18 is a front view in elevation of a building with a machine of the type shown in Fig. 10 mounted on its top;

Fig. 19 is a view in perspective showing a moving picture machine making a projection on one of my screens;

Fig. 20 is a view in perspective of a series of three coaxial revolving screens illustrating the possibility of simultaneous projection on the same; and

Fig. 21 is a front view in elevation of a building with a machine of the type shown in Fig. 11 mounted on its top.

Fig. 22 is a detail view in elevation of an arrangement for creating a screen in the form of an inverted cone.

As hereinbefore stated my invention consists essentially of a method for producing aerial projections which comprises the employment of a screen section revolving through the air forming the surface on which the projection is rendered; and in the novel type of screen itself, obtained through the rapid rotation of screen sections giving to the eye the impression of an uninterrupted surface on which images and figures can actually be projected and made visible.

The devices which may be employed in order to carry my invention into practice do not form a part of this invention; in the drawings, however, I show several types of devices suitable for use in connection with my invention for explanatory purposes. Thus in Fig. 1 I show an elementary form of device suitable for producing a revolving screen of permanent diameter through the

BEST AVAILABLE CO

employment of a revolving element carrying two screen blades. In said figure, 1 and 2 designate said screen blades mounted on a shaft 3 which is caused to rotate by a motor 4. Motor 4 may be located inside of the building while its shaft 3 may be projecting through the wall 5. Screen blades 1 and 2 may be made of translucent material and a projector 6 coaxial therewith and controlled by a switch 7, may be employed to project images or inscriptions or advertisements as may be the case through a suitable slide.

In Fig. 2 a similar arrangement is shown with the difference that the motor 8 is not coaxial with the shaft 9 and the revolving screen 10, but drives a pulley 11 which is mounted on said shaft 9.

In Fig. 3 I show a device composed of a motor 12 on a shaft 13 on which is mounted a revolving screen 14, the entire set being supported outside of the building by means of a bracket 15, the motor being controlled by a switch 16, located inside of the building. In this figure no projector is shown, it being assumed that the screen blades be made of opaque material and adapted for projection from the outside.

In Figs. 4 and 5 is shown a device comprising a screen revolving in a plane normal to the wall of the building, and, therefore, well adapted for signs or advertisement which may be seen from a considerable distance from the sidewalk running along said wall. In the same 17, 18 are the two screen blades mounted on shaft 19 supported on a bracket 20 and driven by means of a belt 21 which is run by motor 22. In the same I show two projectors 23, 24 employed, one on each side of the screen, which will make the projection visible from both sides.

In Fig. 6 I show two possible applications of the elementary type of my revolving screen for advertising or signalling purposes. In the same 25 designates a rotating device adapted to operate two screen blades 26, 27 causing the same to produce a revolving screen in front of a building 28. Such a revolving screen may assume considerable dimensions especially when the rotating device is located on one of the upper stories. Another device is shown mounted on top of the building comprising a vertical shaft 29 carrying two screen blades 30, 31, hinged near the center so that when the device is inoperative the same occupy the position 30', 31' shown in dotted lines. When the shaft is rotated the two blades will be maintained in the horizontal position shown in full lines by centrifugal force and two projectors 32, 33 located one on each side of the screen will produce on the same the desired projection. If it should be sufficient for the projection to be seen from below one lower projector 32 only will be employed, while if the projection should only have to be seen from above, as would be the case for aeroplane signalling the upper projector 33 only would be employed.

In Figs. 7, 8 and 9 I show another type of rotating device adapted for simultaneous operation of four revolving screens at right angles to each other and capable of rotating the four sets of screens also around an axis parallel to the planes of rotation of said screens. In the same 34 designates the body of the machine integral with a vertical tubular support 35 in which is rotatably mounted hub or sleeve 36 of upper frame 37 formed with four arms 38, 39, 40, 41. On the lower part of sleeve 36 is mounted a worm wheel 42 which may be operated or locked by a worm 43 mounted on a shaft 44. Said shaft may in its turn be operated through sprocket wheel 45 mounted on the same connected by a chain 46 to sprocket wheel 47 which is loosely mounted on driving shaft 48 operated by a motor 49. Sprocket wheel 47 may be connected, to or disconnected from shaft 48 by means of a clutch 50. On shaft 48 is also fixed a driving pinion 51 in mesh with gear 52 mounted on vertical shaft 53 rotatably mounted through sleeve 36 and at the upper end of which is fixed a conical gear wheel 54. Said gear wheel 54 is in mesh with pinions 55, 56, 57, 58 respectively mounted on shafts 59, 60, 61, 62 which carry revolving screens 63, 64, 65, 66. Four projectors 67, 68, 69, 70 are also provided, one for each screen. When the machine is in the position shown in the drawing with clutch 50 disconnected worm 43 will lock worm wheel 42 against rotation and, therefore the rotation of shaft 48 transmitted to shaft 53 will be ultimately transmitted to shafts 59, 60, 61, 62 and screens 63, 64, 65, 66 carried thereby, which will, however, rotate permanently in the same plane as shown in full lines in Fig. 8. If sprocket 47 is connected to shaft 48 by means of clutch 50, however, worm 43 will cause a slow rotation of worm wheel 42 and, therefore, of the four-armed frame 37 carrying the screen shafts, and the four screens will rotate simultaneously on their respective shafts and around vertical shaft 53 occupying successive positions around a circumference as shown in dotted lines in Fig. 8. By means of this device, therefore, four different projections may be rendered alternately visible from all directions.

In Fig. 10 I show a machine comprising a stationary axle 71 on which is rotatably mounted a sleeve 72 carrying a screen 73. 74 designates the frame of the machine proper which is rotatably mounted on the base 75, and 76 designates a worm wheel segment integral with axle 71 and pivotally mounted at 77 on frame 74. The various

BEST AVAILABLE COP

mechanisms controlling the operation of axle 71 and sleeve 72 have been described in the other patent application above referred to; and through the same it is possible to adjust the position of axle 71 at any point between the vertical and the horizontal on each side; it is also possible to cause the same to alternately swing from one side to the other and it is furthermore possible to cause frame 74 to rotate on its axis, while axle 71 remains stationary in the position in which it has been set or is caused to swing from one side to the other.

In Fig. 11 I illustrate another universal type of machine comprising a stationary axle 78 integral with worm wheel segment 79 pivotally mounted on a shaft 80 carried by a frame 81, also rotatably mounted like in the previous case on a stationary base 82. On said axle 78 is rotatably mounted a sleeve 83, carrying drums 84 on which can be wound or unwound flexible carriers at the end of which the screen segments may be attached. This type of machine has also been extensively described in my own patent application above referred to and may be used for producing an annular extensible screen which may be caused to change at will its diameter while the plane of rotation may be caused to assume all the positions mentioned in connection with screen 73 of Fig. 10.

In addition to these the collapsible screen may also be caused to assume an undulating motion describing a cone around axle 78. In Figs. 12, 13, 14 I show different types of constructions of screens suitable for use in connection with the machine shown in Fig. 11. The screen shown in Fig. 12 is composed of a frame 85 on which is mounted a panel 86 of translucent material. The screen shown in Fig. 13 is composed of one solid panel 87 adapted for projection from an outer source, and the screen shown in Fig. 14 is composed of a frame 88 on which is mounted a translucent screen composed of several sections 89, 90, 91, 92. This construction is suitable for screens of large dimensions. In Fig. 15 I illustrate the possibility of attaching a lamp 93 at the end of flexible carrier 94 in place of a screen in order to obtain luminous effects.

In Figs. 16 and 17 I illustrate two different arrangements of screens for flexible carriers, the first one of which will create three annular concentric screens 95, 96, 97 and the other one producing a single wide annular screen 98.

In Fig. 18, 99 designates a building on the top of which has been mounted a machine 100 of the type shown in Fig. 10 and capable, therefore, of producing rotating screens in a number of positions at the front or at the side or above the building.

In Fig. 19 I illustrate the possibility of projecting moving pictures on my type of revolving screen, 101 designating a moving picture machine in the act of projecting a picture on revolving screen 102.

In Fig. 20 I illustrate the possibility of simultaneously obtaining the same projection on a plurality of coaxial revolving screens 103, 104, 105. The only condition necessary in order to make it possible for the rays of light to pass through from one screen to the next is that the screen blades of the various screens must be set at different angles, so that the blades of the screen in front will not prevent the rays of light from reaching the blades of the screen in the rear.

In Fig. 21, 106 designates a building on the top of which is mounted a machine 107 of the type shown in Fig. 11, giving, therefore, the possibility of producing annular screens of various diameters set in a number of positions at different angles and adapted to assume alternative swinging motion or rotating motion or undulating motion, or a combination of all these motions adjustable at will.

In Fig. 22 I illustrate the possibility of causing a collapsible rotating screen to assume a position above the horizontal, by attaching screens 108, 109 to flexible carriers 110, 111 asymmetrically in relation to their center of gravity. The screens will thus acquire a tendency to remain in an inclined position on account of being overbalanced and during the course of their rotation the resistance of the air against their inclined surfaces will cause the same to climb upwardly, this action being similar to the one causing an aeroplane to climb in the air.

From the foregoing it is seen that I provide a novel method for producing aerial projections whereby it is possible to obtain results which would be impossible with the methods heretofore in use. I also provide a screen of a novel and improved construction which of itself is also possessed of many advantages which are not found in screens heretofore in use. While all the screens shown in the drawings are produced by elements rotating around a point of support, it is obvious that similar effects could be obtained by imparting to the screen elements some other motion as long as the basic principle is retained of moving the same through the air at a speed sufficient to give to the eye the illusion of an uninterrupted surface. It is of course understood that the various devices shown in the drawings for producing the screen are intended for illustrative purpose only; and I therefore reserve myself the right to carry my invention into practice by means of any suitable device and through the employment of any suitable material such as will enter fairly into the scope of the appended claims.

BEST AVAILABLE COPY

I claim:

1. The combination of a screen segment, means for attaching the same at one of its ends, means for causing the rotation of said screen segment around its point of support, a frame carrying said screen segment, and means for moving said frame so as to alter the plane of rotation of said segment.

2. The combination of a screen segment, means for attaching the same at one of its ends, means for causing the rotation of said segment around its point of support, a movable frame carrying said segment, and means controlling the movement of said frame causing the plane of rotation of said segment to move along a predetermined path of travel.

3. The combination of a screen segment, supporting means for the same, extensible means connecting said segment to said supporting means, and means for causing the rotation of said supporting means around its axis.

4. The combination of a screen segment, supporting means for the same, extensible means connecting said segment to said supporting means, and means for causing the rotation of said supporting means around its axis, and means for controlling the extension and retraction of said flexible connecting means.

5. The combination of a screen segment, supporting means for the same, extensible means connecting said segment to said supporting means, and means for causing the rotation of said supporting means around its axis, and means for controlling the extension and retraction of said flexible connecting means, and means for altering the plane of rotation of said supporting means.

6. The combination of a screen segment, supporting means for the same, extensible means connecting said segment to said supporting means, and means for causing the rotation of said supporting means around its axis, and means for controlling the extension and retraction of said flexible connecting means, and means for simultaneously causing the plane of rotation of said supporting means to move along a predetermined path of travel.

MARIO SCHIESARI.

Witnesses:
R. PASCEK,
A. L. GONZALEZ.