(No Model.) 2 Sheets—Sheet 1.

A. A. HAMERSCHLAG.

ROENTGEN RAY EXHIBITION APPARATUS.

No. 568,720. Patented Sept. 29, 1896.

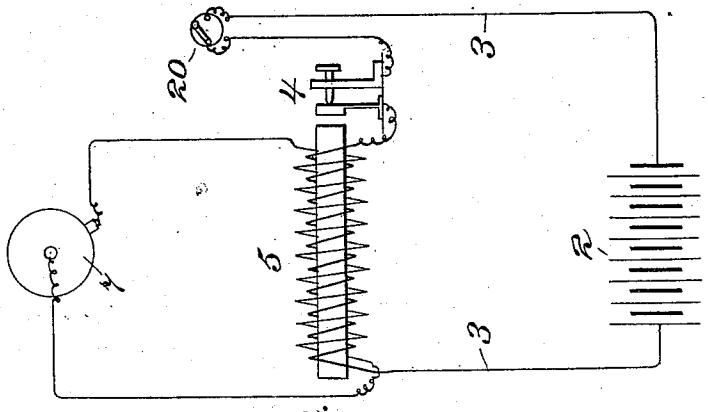


Fig. 2.

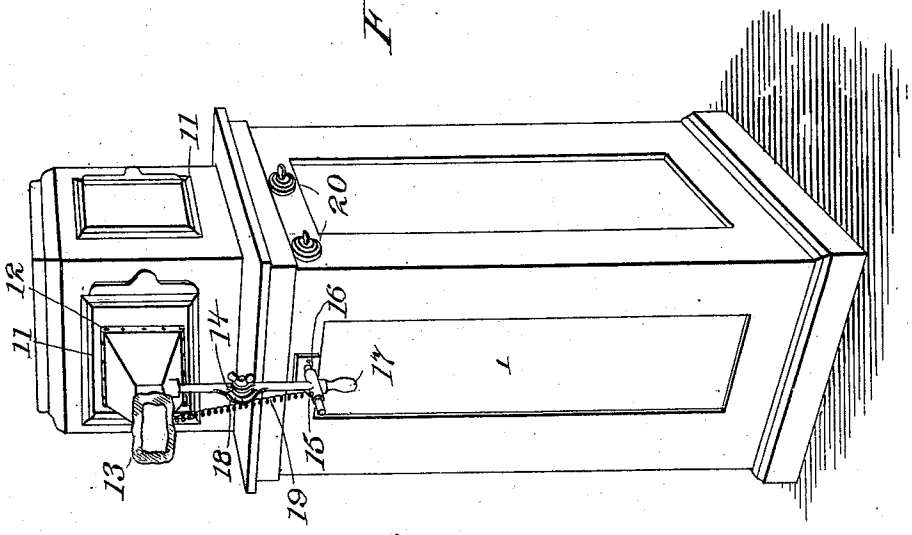


Fig. 1.

WITNESSES:

W. H. Humphrey.

Jas. W. White.

INVENTOR

Arthur A. Hamerschlag

BY

Knight Bros.

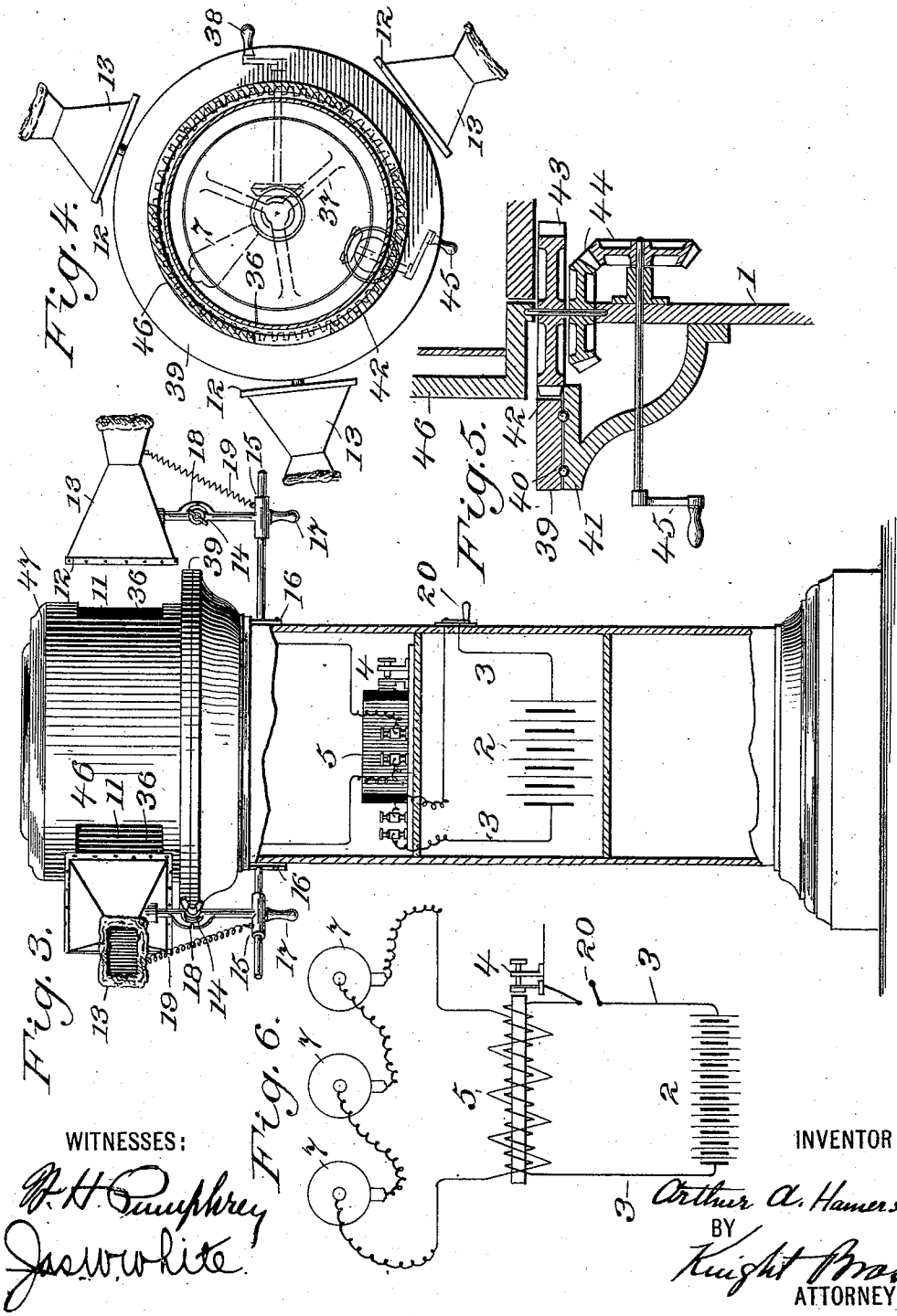
ATTORNEYS.

(No Model.) 2 Sheets—Sheet 2.

A. A. HAMERSCHLAG.

ROENTGEN RAY EXHIBITION APPARATUS.

No. 568,720. Patented Sept. 29, 1896.



WITNESSES:

F. H. Dunphrey

Jas. W. White

INVENTOR

Arthur A. Hamerschlag

BY

Knight Bros

ATTORNEYS.

UNITED STATES PATENT OFFICE.

ARTHUR A. HAMERSCHLAG, OF NEW YORK, N. Y., ASSIGNOR TO THE CATHOSCOPE ELECTRICAL COMPANY, OF SAME PLACE.

ROENTGEN-RAY-EXHIBITION APPARATUS.

SPECIFICATION forming part of Letters Patent No. 568,720, dated September 29, 1896.

Application filed May 20, 1896. Serial No. 592,265. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR A. HAMERSCHLAG, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Roentgen-Ray-Exhibition Apparatus, known as the "Cathascope," of which the following is a specification.

My invention has for its object the popularization of apparatus for the exhibition of Roentgen-ray effects. I have devised an instrument which I have named the "cathascope" which is adapted to place before the public, in simple form, means for seeing and investigating the effects of cathode or Roentgen rays in penetrating objects opaque to ordinary light rays.

My apparatus embraces an exhibition case or box in which are mounted means for producing suitable current, suitable fluorescent tube or tubes, a fluorescent screen or screens mounted to be adjustable to suit the user of the instrument, and means for permitting the user of the instrument to place between the fluorescent screen or screens and the fluorescent tube any desired object to be viewed. I also provide a movable carriage for supporting objects to be viewed and means for moving or adjusting the tube or tubes into position before the fluorescent screens.

I will first describe my invention in its several forms with reference to the accompanying sheets of drawings, and will then point out in the claims the novel features.

In said drawings, Figure 1 is a front perspective view of my cathascope. Fig. 2 is a diagrammatic representation of the essential parts of the same. Fig. 3 is a vertical sectional view of a machine having a movable carriage for the objects to be viewed and mechanism for moving the fluorescent tubes. Fig. 4 is a top sectional view of the instrument shown in Fig. 3. Fig. 5 is a detail sectional view of a part thereof. Fig. 6 is a detail diagrammatic view illustrating the use of a plurality of fluorescent tubes arranged in series in the secondary circuit.

The instrument consists of a casing 1, of suitable size and form to adapt it for exhibition purposes. Within this casing I mount, first, means for producing the desired current, such as a secondary battery 2; second, an induction-coil 5, having a circuit-breaker 4, and with its primary coil in circuit with the wires 3, leading from the battery 2, and, third, a fluorescent tube 7 in circuit with the secondary coil of the induction-coil.

The fluorescent tube or bulb 7 is preferably placed at the upper part of the box or casing 1, which has preferably one or more apertures 11, according to the number of fluorescent screens which it is desired to use. The fluorescent tube is arranged to focus its rays on said screen or screens. The fluorescent screen or screens 12 are mounted on and form part of one or more fluoroscopes 13, placed opposite the apertures 11, which are shown provided with removable shutters formed of a material transparent to the Roentgen rays.

The object to be viewed is placed between the aperture in the box or casing and the eyepiece or fluoroscope 13. The eyepiece or fluoroscope 13 is mounted through a hinged joint 14 upon a sliding head 15, carried by a rod or bracket 16, and adapted to be adjusted by a handle 17, so that the eyepiece or fluoroscope can be moved toward or away from the casing to suit each user of the instrument. The joint 14 has abutting shoulders 18, so as to prevent the eyepiece or fluoroscope from getting too far out of position, and a spring 19 can be employed to hold these abutting shoulders together with a yielding pressure, which yields under the pressure of the head of the user of the instrument so that he may view the object at the desired angle.

When the instrument is to be used by the public, I employ a suitable switch 20 for throwing it into and out of circuit. As represented in the drawings, I may employ one or more fluorescent tubes. When a plurality of tubes are employed, one for each of a plurality of screens, they may be arranged in series in the secondary circuit of the induction-coil. (See Fig. 6.)

Figs. 3, 4, and 5 illustrate a form of the invention which is readily adapted to the causing of the exposure of a series of objects before the several eyepieces or fluoroscopes of the instrument. In this form of the invention I inclose the tubes within a suitable cylindrical shutter or screen 36 of material trans-

parent to the Roentgen rays. The screen is made cylindrical to adapt it more satisfactorily to this form of the machine. But one tube is shown in Fig. 4, but a number may be employed, as indicated in Fig. 6. The fluorescent tube 7 is mounted within said cylindrical screen 36, so as to focus on one of the fluorescent screens of the fluoroscopes. It may be mounted upon a rotary spider or frame 37, having a suitable crank 38 geared to it for turning it so as to bring the point of focus to any desired point on the screen. Instead of one a plurality of tubes may be used with this form of the invention, in which case all of the tubes would be mounted on the rotary carriage or spider.

The eyepieces or fluoroscopes 13 are mounted around the instrument at convenient points. 39 is an annular carriage mounted by wheels or balls 40 on an annular way or track 41. To it may be attached, or on it may be placed, any object which it is desired to view through the eyepieces 13. The carriage 39 has an interior cog 42, so that it may be driven by a pinion 43, actuated by bevel-gears 44, from a handle 45. Thus any series of objects placed on or attached to the carriage 39 may be brought successively before the several screens of eyepieces 13 and between the eyepieces and the cylindrical screen or shutter 36. The object of this arrangement is to illustrate the effect of the rays upon various kinds of objects, showing the different degrees of penetrability of the rays. Outside of and to protect the cylindrical screen 36 I may arrange a protecting cylindrical casing 46, which may have apertures at the points opposite the eyepieces 13, or it may be imperforate at those points, in the latter case the view being had directly through the shutter or screens 36 and the material of which the protecting casing 46 is composed. A suitable cover 47 is also provided to protect the interior from dust.

It is obvious that the carriage here shown can be employed in an instrument in which the screen and the fluorescent tubes are of various shapes and arrangements instead of that here shown.

I have not herein shown and described the particular form of electrical mechanism for most satisfactorily producing the Roentgen rays, though this mechanism was originally set forth in this application, but I have covered the said mechanism in a divisional application, filed July 9, 1896, Serial No. 598,529.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. In an apparatus for exhibiting Roentgen-ray effects, the combination of a box or casing 1, one or more fluorescent tubes therein, heads or supports adjustably supported upon the box or casing, and one or more fluoroscopes or eyepieces hinged to said heads or supports, substantially as set forth.

2. In an apparatus for exhibiting Roentgen-ray effects, the combination of the box or casing 1, one or more fluorescent tubes therein, and one or more fluoroscopes or eyepieces having hinged support on said box or casing, and a suitable spring or springs, substantially as set forth.

3. In an apparatus for exhibiting Roentgen-ray effects, the combination of a box or casing, a source of electricity, one or more fluorescent tubes, one or more fluorescent screens, and a movable carriage or support adapted to carry one or more objects before said screen or screens, as set forth.

4. In an apparatus for exhibiting Roentgen-ray effects, the combination of a box or casing, the source of electricity, one or more fluorescent tubes, one or more fluorescent screens, and the circular carriage having suitable means of operation and adapted to carry a series of objects before said screen or screens, substantially as set forth.

5. In an apparatus for exhibiting Roentgen-ray effects, the combination of a box or casing, a plurality of fluoroscopes or eyepieces, and one or more fluorescent tubes having means for moving the same before the several fluoroscopes or eyepieces, substantially as set forth.

6. In an apparatus for exhibiting Roentgen-ray effects, the combination of a box or casing 1, a cylindrical screen 36, two or more fluoroscopes or eyepieces 13, and a traveling carriage 39 all arranged and adapted to operate, substantially as set forth.

7. In an apparatus for exhibiting Roentgen-ray effects, the combination of a box or casing, a cylindrical screen 36, an annular carriage 39 adapted to carry a series of objects, one or more fluoroscopes or eyepieces mounted around the said screen, one or more fluorescent tubes mounted within the said screen, and means for operating said carriage, substantially as set forth.

8. In an apparatus for exhibiting Roentgen-ray effects, the combination of a box or casing, a cylindrical screen 36, an annular carriage 39 adapted to carry a series of objects, one or more fluoroscopes or eyepieces mounted around the said screen, one or more fluorescent tubes mounted within the said screen, a protecting casing for said screen, and means for operating said carriage.

9. In an apparatus for exhibiting Roentgen-ray effects, the combination of a box or casing, a cylindrical screen 36, an annular carriage 39 adapted to carry a series of objects, one or more fluoroscopes or eyepieces mounted around the said screen, one or more fluorescent tubes mounted within the said screen, a protecting casing for said screen having suitable openings, and means for operating said carriage.

ARTHUR A. HAMERSCHLAG.

Witnesses:
M. V. BIDGOOD,
J. GREEN.