Nov. 29, 1932. F. A. BERG ET AL 1,889,431

PHOTO ELECTRIC TUBE

Filed July 12, 1929 2 Sheets-Sheet 1

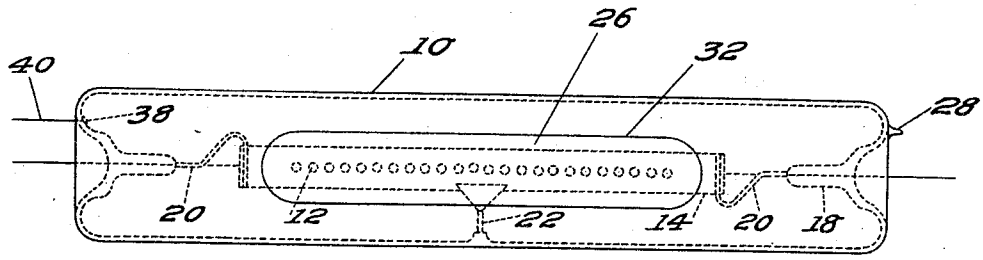
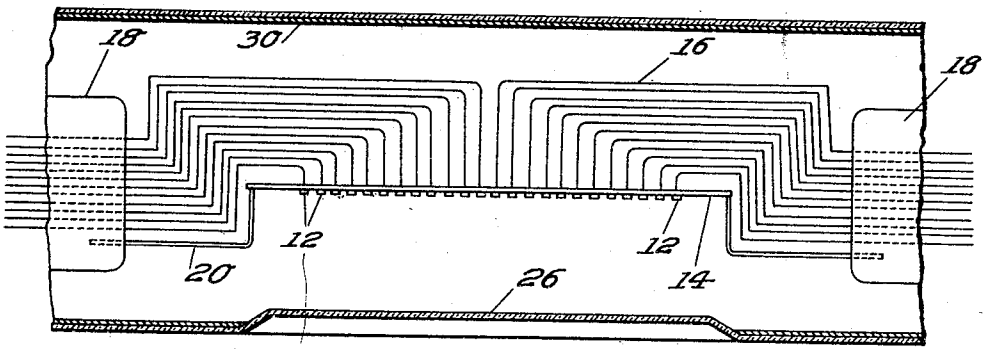


FIG. 1



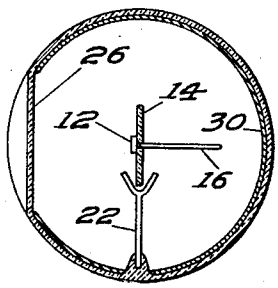


FIG. 2

FIG. 3

AND WILLIAM W. HARPER
FREDERICK A. BERG
INVENTOR

PER Albert J. Fitch
ATTORNEY

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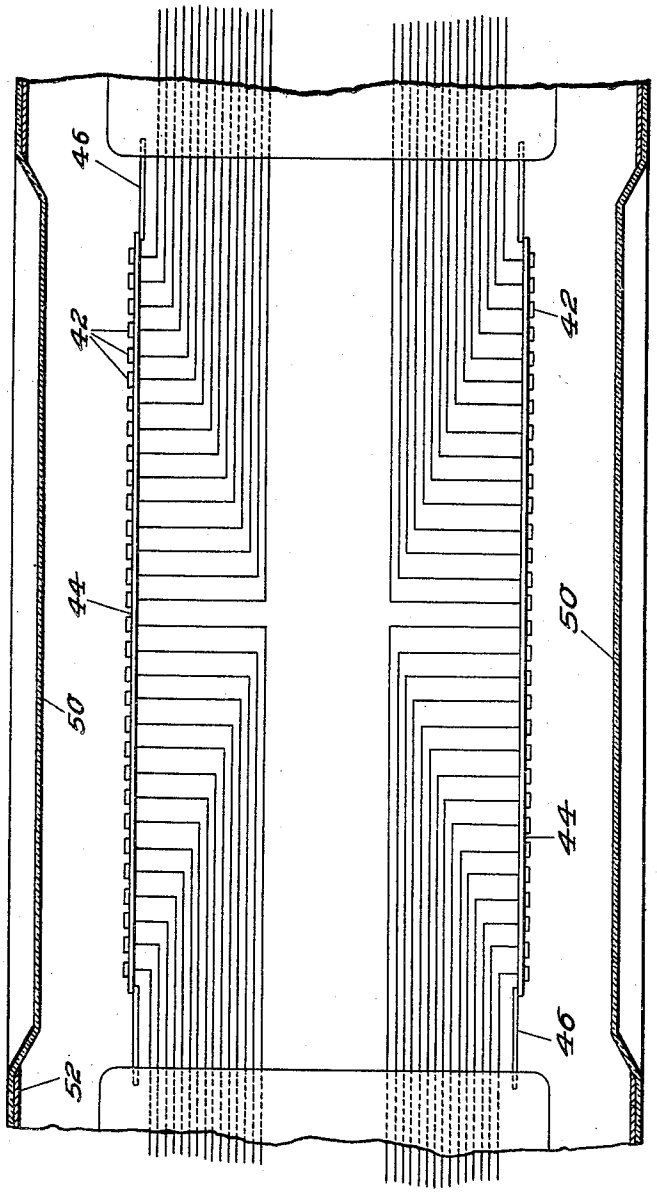


FIG. 4

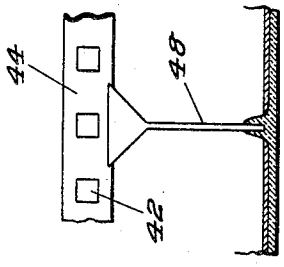


FIG. 5

AND WILLIAM W. HARPER
FREDERICK A. BERG
INVENTOR

PER Albert J. Fitch
ATTORNEY

Patented Nov. 29, 1932 1,889,431

UNITED STATES PATENT OFFICE

FREDERICK A. BERG AND WILLIAM W. HARPER, OF CHICAGO, ILLINOIS

PHOTO-ELECTRIC TUBE

Application filed July 12, 1929. Serial No. 377,880.

This invention relates to an improved multi-cathode photo-electric vessel and has for one of its principal objects the provision of a light sensitive vessel which will have a plurality of cathodes therein for special purposes.

One of the important objects of this invention is to provide in a photo-electrical vessel a plurality of light sensitive elements intended for the selective control of various types of complex electrical net-works.

Another important object of this invention is to provide in a photo-electric vessel means for controlling a selective relay net-work so disposed as to permit distribution of sound and other impulses to various points either simultaneously or in a regulated sequence.

Other and further important objects of the invention will be apparent from the disclosures in the accompanying drawings and following specification.

The invention, in a preferred form, is illustrated in the drawings, and hereinafter more fully described.

In the drawings:

Figure 1 is a front elevation of the improved multi-cathode photo-electric vessel of this invention.

Figure 2 is an enlarged fragmentary top plan view of the interior thereof.

Figure 3 is a central cross sectional view of the same.

Figure 4 shows a modified form of construction.

Figure 5 is a detail view of a portion of Figure 4.

As shown in the drawings:

The reference numeral 10 indicates generally the glass envelope in which the elements of this photo-electric vessel are disposed. These elements comprise essentially a plurality of cathodes 12 which as shown are twenty-four in number, but which number can obviously be changed as desired or convenient. Any number of these vessels can be connected in series or parallel.

The cathodes are supported upon one face of a mica strip 14, each cathode being electrically connected to a lead-in wire 16, all of which pass out through suitable sealed lead-in elements 18 at both ends of the vessel 10. The wires are insulated by baked enamel, which eliminates occlusion of gases.

Also mounted in each of these lead-in elements is a support 20 preferably composed of comparatively heavy wire by means of which the mica strip 14 is mounted in proper position in the vessel, and a further support 22 is provided sealed into the bottom of the vessel which assists in maintaining proper positioning of the mica strip and its cathodes.

In practice the mica strip 14 is made in two sections, and each section with its supporting wire 20 is slipped into the open end of the tube before the same is sealed and the inner ends are aligned upon the support 22 so that these two parts form substantially the equivalent of one long mica strip.

It will be noted that the vessel although substantially tubular has one portion thereof flattened as shown at 26, this providing a plane window through which rays of light enter for impinging upon one or more of the cathodes 12.

This device can be used in the operation of invention entitled "Motion picture screen and sound box" filed by applicant, Frederick A. Berg, November 30, 1928, Serial No. 322,863. It is also adaptable for remote control of various appliances.

The double window feature illustrated in Figure 4, makes one side always available in any emergency.

After the vessel has been assembled as shown, it is connected to a vacuum system in the usual manner by means of an opening provided at the point 28, and when the vacuum reaches a suitable degree, the inner wall of the vessel is completely coated with a metallic deposit 30 of some photo-active metal in any well-known manner. This may be easily accomplished by means of distillation, and during this process the studs or cathodes being of metal are also coated with this photo-active metal. When a sufficiently heavy coat of metal has been deposited, the distillation is stopped, and then a small flame providing sufficient heat to melt the inner metal coating is next applied to the flattened window 26, and in this manner, the inner

coating is removed as shown at 32 in Figure 1 so as to permit controlling light beams to be directed upon the photo-active studs or cathodes 12.

The process is then continued to completion in the ordinary manner such as by activating the vessel and maintaining it in this state or by the further introduction of hydrogen, argon, neon or some similar gas, the vessel being then sealed off at the point 28. A small well 38 holding a lead wire 40 for the anode connection is sealed into the end of the vessel opposite the exhaust point 28.

It will be evident that the activating of the cathode studs by means of beams of light will permit current to flow between the anode wire 40 and one or more of the cathode wires 16. In this way, any one or more of a connected series of relays may be operated whereby various effects in sound and light distribution can be obtained. This can be particularly applied to a talking motion picture system and also to the control of organs and other musical equipment. Further possibilities are found in the design of automatically recording stock exchange boards, and for many other purposes wherein selective control of one or more of a plurality of instruments is desired by means of light rays.

In a talking motion picture studio, a separate band of film adjacent the motion picture film is constructed so as to permit light beams of varying duration and intensity and of certain spaced relation to pass therethrough and impinge upon one or more of the cathodes in a certain sequence. Besides operating relays in a predetermined order, it will be evident that inasmuch as the intensity of the light rays can be varied by shaded gradations on the film, corresponding intensity of action can be had with the relays.

In the modification shown in Figures 4 and 5, a greater number of cathodes are provided as illustrated at 42, and from an inspection of Figure 5, it will be evident that these cathodes are square in shape thereby providing a greater area for the light ray impact.

It will be further evident that two banks of thirty cathodes each are provided, each bank separated on a strip of mica or the like 44. The mica strips themselves are maintained in position by means of end rods 46 and center supports 48.

Opposite each bank of cathodes is a flattened window 50 from which the alkali metal, such as potassium hydride or other coating has been removed, this coating, which forms the anode, remaining on the adjacent walls of the vessel as illustrated at 52.

We are aware that many changes may be made and numerous details of construction varied throughout a wide range without departing from the principles of this invention, and we therefore do not purpose limiting the patent granted hereon otherwise than as necessitated by the prior art.

We claim as our invention:

A photo electric tube having an interior anode coating and a plurality of photo-sensitive cathodes, said cathodes mounted in two groups, and a window in the vessel for each group, each group of cathodes facing its respective window.

In testimony whereof we affix our signatures.

FREDERICK A. BERG.
WILLIAM W. HARPER.