

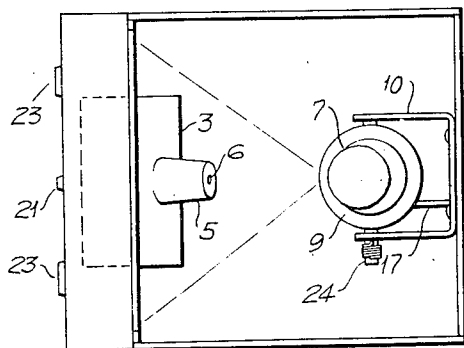
**Feb. 6, 1934.**

W. J. HERDMAN

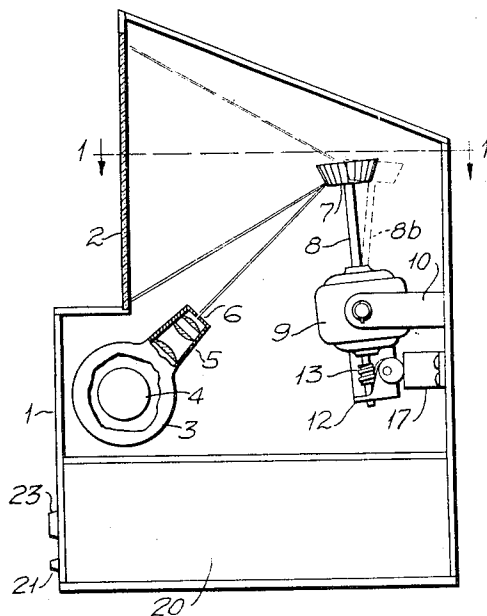
**1,945,607**

TELEVISION RECEIVER

Filed Dec. 17, 1931



**EEG**



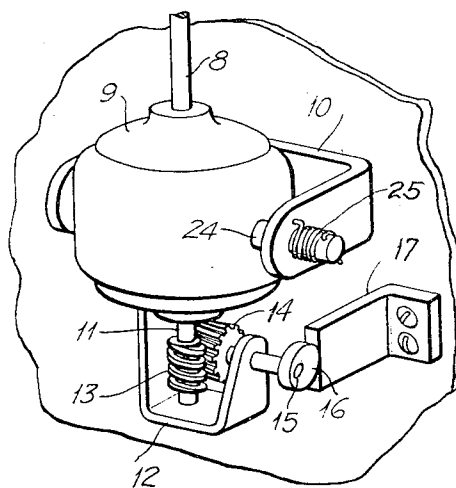
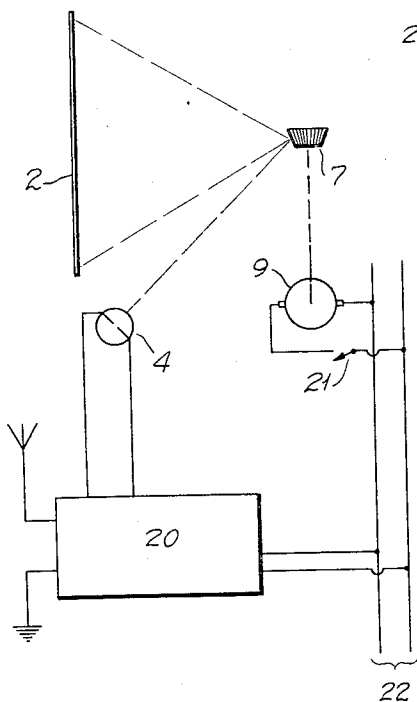












INVENTOR

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## UNITED STATES PATENT OFFICE

1,945,607

## TELEVISION RECEIVER

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Serial No. 581,607

2 Claims. (Cl. 178—6)

My invention pertains in general to television systems and specifically relates to television receiving apparatus for reproducing a transmitted television image.

One of the objects of my invention consists in providing a compact and simple form of television receiving apparatus employing a minimum number of parts for producing a comparatively large screen image.

Another object consists in producing a television receiver utilizing a single reflecting element having two components of motion for effecting the movement of a light spot over a viewing screen.

I accomplish these and other desirable objects in a novel television receiver employing a synchronous motor for effecting the movement of a single reflecting element to cause a beam of light incident thereon to scan a viewing screen.

In the drawing which accompanies and forms a part of this specification and in which like reference numerals designate corresponding parts throughout:

Fig. 1 is a horizontal sectional view of one embodiment of the television receiver of my invention taken along the line 1—1 of Fig. 2;

Fig. 2 is a transverse sectional view of my television receiver;

Fig. 3 is a perspective view of a part of my television receiver showing the driving mechanism employed therewith; and

Fig. 4 is a diagrammatic representation of the electrical circuit employed in my system.

My invention is directed to providing a simple type of television receiver having a comparatively large viewing screen suitable for the entertainment of a group of spectators. In accordance with my invention, I provide a source of intense illumination for producing a light beam incident upon a moving reflector element for scanning a viewing screen. The movement of the reflector element in both co-ordinates of the viewing screen is produced by a single synchronous motor provided with a minimum number of moving mechanical elements.

Referring to the drawing in detail and particularly to Fig. 2, there is provided a housing 1 having a viewing screen 2 situated in the upper front portion thereof. This viewing screen 2 is composed of a translucent material such as ground glass. A source of light 3 is provided within the housing 1 and includes a neon lamp 4 and lens tube 5 having a slit 6 disposed in one end thereof for projecting a small but intense beam of light. The light source 3 is indicative of any means for

supplying light modulated in accordance with television signals and may be of the Kerr cell and Nicol prism type if desired. The light beam projected from the lens tube 5 falls upon one of the reflecting surfaces of a reflector element 7 having, in the present embodiment of my invention, 20 plane reflecting surfaces peripherally disposed on a supporting member.

Referring to Fig. 1 the reflecting surfaces of the reflector element 7 are formed in a manner such as to cause the beam of light incident thereon to laterally sweep across the screen 2 as the member 7 is rotated.

The member 7 is rigidly secured to one end of a shaft 8 which is a continuation of the armature shaft of a motor 9. The motor 9 is of the synchronous type adapted to keep in step with commercial alternating current supply. The housing of the motor 9 is supported by a spindle 24 pivotally mounted in a supporting yoke 10 for movement in a plane perpendicular to the plane of the viewing screen 2. The supporting yoke 10 is secured to the rear wall of the housing 1, as shown in Fig. 3.

A shaft 11 which is a continuation of the armature shaft of motor 9 is journaled in a bearing member 12 and is provided with a worm 13. The worm 13 engages with a worm gear 14 mounted on a shaft 15. Shaft 15 is journaled in bearing member 12 and is provided at one end with a disc 16 eccentrically mounted thereon. The disc 16 peripherally engages with a bearing member 17 secured to the rear wall of the housing 1. A spring 25 is coiled about the spindle 24 and is secured to the yoke 10 for causing the disc 16 to continuously engage with the bearing member 17. In the present embodiment of my invention, the worm 13 and gear 14 are designed to provide for a six to one reduction. That is, for every six revolutions of the shaft 11, the disc 16 will be rotated one complete revolution, whereby the motor 9 will be moved about the pivotal mounting in the yoke 10.

In the lower portion of the housing 1 there is provided a radio receiver 20 for effecting the reception of television signals. The output circuit of the receiver 20 is connected with the neon lamp 4 for producing the intensity modulation, by television signals, of the light produced thereby. The control of the radio receiver 20 for selection of desired television broadcasting stations is accomplished by control knobs 23 situated on the front panel of the housing 1.

Referring to Fig. 4, the motor 9 is connected through switch 21 to power lines 22 supplying

commercial alternating current at 60 cycles per second. The switch 21 is mounted on the front panel of the housing 1 adjacent knobs 23. The radio receiver 20 is also connected with power lines 22 for deriving filament current and anode voltages for the operation of the usual thermionic tubes. The output circuit of the receiver 20 is connected with neon lamp 4 for producing illumination in accordance with the received television signals.

In the operation of my television receiver for reproducing a visual image, the switch 21 is closed, thereby completing a circuit from the power lines 22 to the motor 9. The neon lamp 4 will produce a beam of light varied in intensity in accordance with signals received by the receiver 20. The receiver 20 may be adjusted by knobs 23 to effect reception from any desired station. In the present embodiment of my invention, I employ an armature for the motor 9 having 2 poles whereby the motor, operating from 60 cycle current supply, rotates the shaft 8 at a speed of 3600 revolutions per minute or 60 revolutions per second.

Since the reflector element 7 is provided with 20 reflecting faces, the beam of light incident thereon will be made to laterally sweep across the screen 2 at a rate of 1200 times per second. As the motor 9 rotates, the worm 13 and gear 14 will cause the shaft 15 to eccentrically rotate the disc 16 at a reduced rate. The eccentric rotation of disc 16 will cause a rocking movement of motor 9 in the yoke 10 to move the shaft 8 from the full line position of Fig. 2 to the dotted line position 8b. For each complete revolution of the disc 16 the shaft 8 will be moved to the position 8b and return, whereby the light beam from the lens tube 5 incident on the rotating reflector element 7 will be made to sweep vertically back and forth across the viewing screen 1. This last motion of the light beam occurs at the rate of 20 times per second and corresponds to the number of independent pictures per second of the television image for producing the simulation of motion.

As the beam of light is thus vertically swept back and forth across the screen 1 at the rate of 20 times per second, the rotation of the 20-sided reflector element 7 will cause the beam to be simultaneously laterally swept across the viewing screen 1 at a rate of 1200 times per second for effecting the complete scanning of the viewing screen. It will be evident then, that my television receiver, when operated from 60 cycle alternating current, provides for the reception of a 60 line television image comprising 3600 picture elements 20 times per second. To accomplish framing of the image, the switch 21 may be opened and closed several times until the image is brought into the proper position. For certain purposes, the viewing screen 2 may be dispensed

with and the scanning light beam reflected directly on a wall or other screen as in cinematographic apparatus for home use.

For purposes of television transmission, my television apparatus may be employed with the viewing screen 2 removed and the source 3 providing steady illumination. The object to be scanned can then be situated directly in front of the housing 1 and the light from the source 3 reflected by the reflector element 7 will scan the object to be ultimately reflected to photoelectric cells connected with suitable transmitting apparatus.

Some of the advantages to be derived from my television receiver are its extreme simplicity, and the increase in brilliancy and size of the image over home receivers now extant. Although I have shown a preferred embodiment of my television receiver it will of course be obvious that many changes can be made without departing from the intended scope of my invention. I do not therefore desire to limit myself to the foregoing except insofar as may be pointed out in the appended claims:

What I claim as new and original and desire to secure by Letters Patent of the United States is:

1. Television apparatus comprising, a synchronous motor, means for producing a beam of light, a reflector element supported and rotatably driven by said motor for causing said beam of light to move, by reflection, along one axis of a viewing screen, and mechanical means for moving said motor and said reflector element supported thereby for causing said beam of light to move, by reflection, in the other axis of said viewing screen, said mechanical means being driven by said motor.

2. A television receiver comprising, a housing, a viewing screen in said housing, means within said housing for receiving television signals, means within said housing for producing a beam of light under control of said television signals, said means including a lens system and an aperture plate, a reflector element having a plurality of plane reflecting surfaces thereon for reflecting said beam of light to said viewing screen, a synchronous motor including a shaft for supporting and rotating said reflector element to cause said beam of light to move, by reflection, along one axis of said viewing screen, a pivotal mounting for said motor, a worm and gear driven by said motor, an eccentric member driven by said gear and contacting with a member secured to said housing for effecting the movement of said motor about said pivotal mounting to subject said shaft to a tilting movement whereby said reflector element causes said light beam to move in the other axis of said viewing screen.

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