No. 664,430. Patented Dec. 25, 1900.

A. POLLAK.

TELAUTOGRAPH OR FACSIMILE TELEGRAPH.

(Application filed Dec. 21, 1899.)

(No Model.) 2 Sheets—Sheet 1.

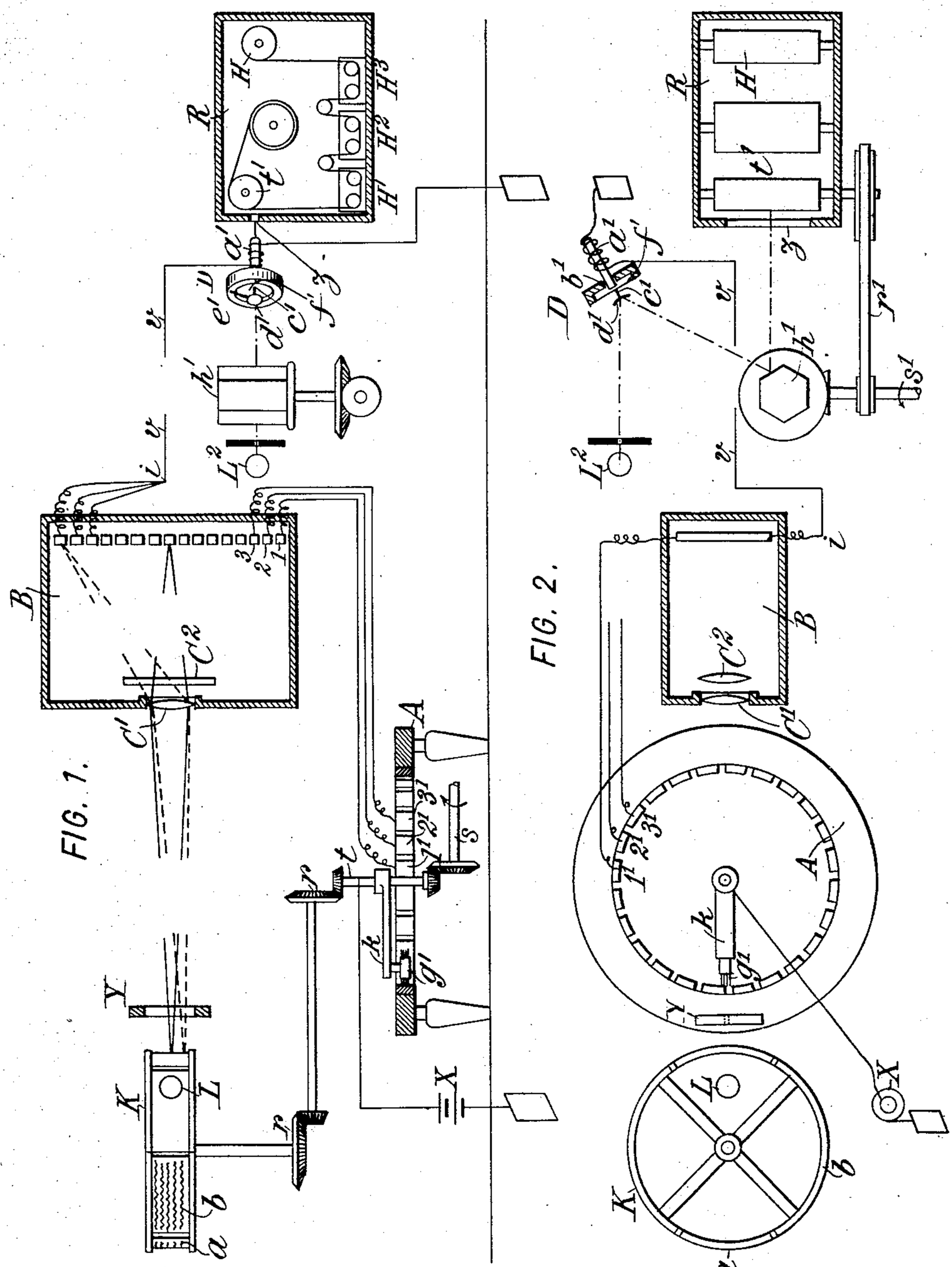

FIG. 1.

FIG. 2.

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FIG. 3.

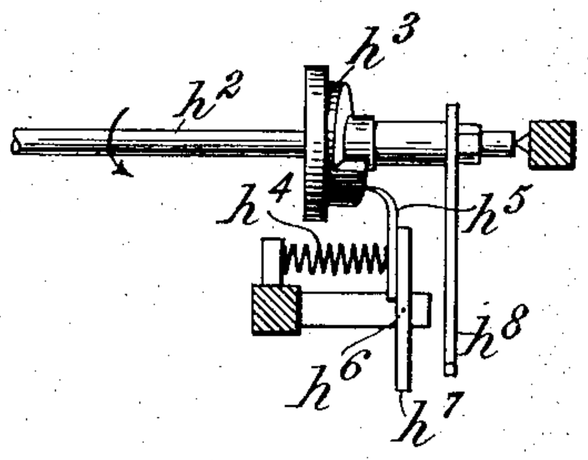


FIG. 5.

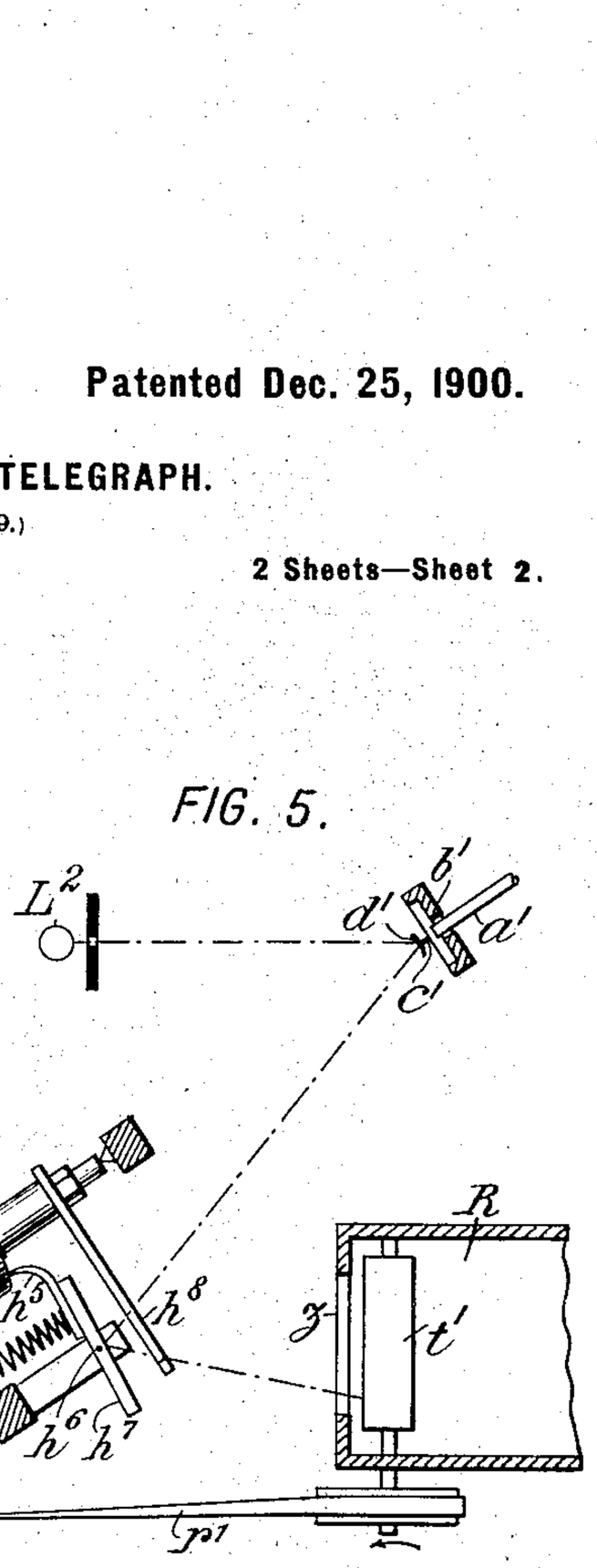


FIG. 4.

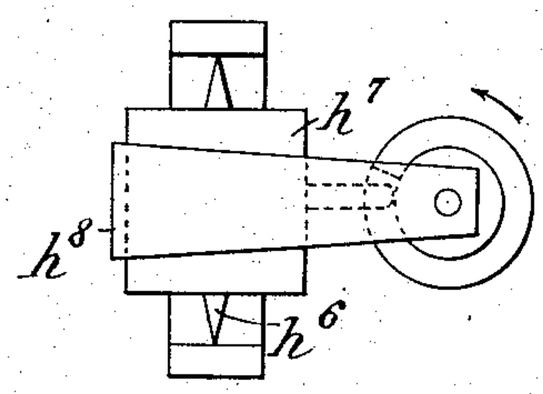
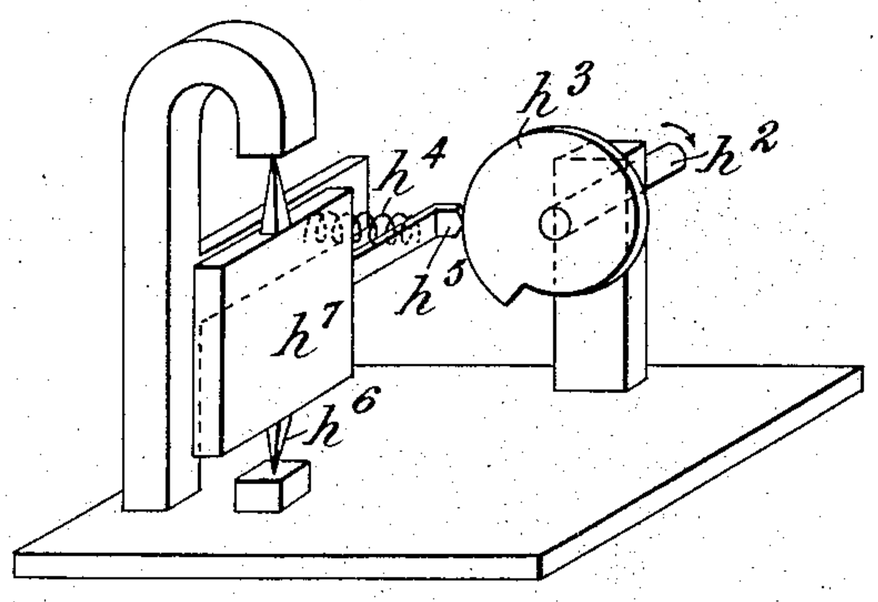


FIG. 6.



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ANTON POLLAK, OF BUDA-PESTH, AUSTRIA-HUNGARY.

TELAUTOGRAPH OR FACSIMILE TELEGRAPH.

SPECIFICATION forming part of Letters Patent No. 664,430, dated December 25, 1900.

Original application filed February 17, 1899, Serial No. 705,771. Divided and this application filed December 21, 1899. Serial No. 741,116. (No model.)

To all whom it may concern:

Be it known that I, ANTON POLLAK, a citizen of Hungary, residing at Buda-Pesth, in the Empire of Austria-Hungary, have invented certain new and useful Improvements in Telautographs or Facsimile Telegraphs, of which the following is a specification.

This application is a division of my application filed February 17, 1899, Serial No. 705,771.

In my application, Serial No. 681,729, filed May 25, 1898, I described a telautograph, the object of that invention being to reproduce telegraphic messages in a form exactly corresponding with the original.

My present invention comprises an improved means for moving the ray of light along the receiving-chamber, which means may be conveniently substituted for the rotary polygonal mirror shown in my last-named application.

Figure 1 is a sectional view, and Fig. 2 a plan, partly in section, of a form of apparatus shown in my said last-named application. Fig. 3 is a plan view, partly in section, showing the preferred form of my present invention. Fig. 4 is a front elevation. Fig. 5 is a plan view, partly in section, showing the operative connection of my device with a telautograph of the character shown in Figs. 1 and 2; and Fig. 6 illustrates a modification.

I will first briefly describe the apparatus set forth in my said last-named application and its mode of operation with reference to Figs. 1 and 2.

The message *a b* to be sent is written, for example, upon transparent paper and mounted upon a carrier K, within which is arranged a source of light L. In front of the carrier K is placed a screen Y, having a narrow vertical slit, preferably one-third of a millimeter in width. The image of a narrow section of the message is thus projected through the screen. A chamber B is arranged so as to receive this image and has at its rear a series of selenium-cells 1 2 3, &c., the height and breadth of the image being increased by the lenses C' C^2, so that each dot of the message substantially covers a cell. Such of the cells are illuminated as receive the rays of light passing through the transparent paper, while those corresponding to the opaque lines of the message are darkened. The cells 1 2 3, &c., are electrically connected to a corresponding series of contacts $1'$ $2'$ $3'$, &c., upon a commutator A. A brush g', carried by an arm k, is rotated by a shaft t around the series of contacts, and thus sends an electric current from a battery X through each of the cells successively. Each of the cells is connected at i to a common line-wire v, which leads to the receiving-station. The current passes into an electromagnet a' of a telephone-like receiver D and attracts a diaphragm f'. A small reflector d' is pivotally connected to the frame of the telephone by an arm e' and is connected to the diaphragm by a rod c'. Normally when the diaphragm is held strongly attracted the reflector is tilted, for example, downwardly, and when the attraction is decreased the reflector tilts upwardly. Thus a ray of light from the source L^2 is vibrated vertically upon one side of a rotary polygonal mirror h', which in its rotation reflects the vibrating ray along a slit z, formed in a chamber R, in which latter is moved a photosensitive strip which receives such of the rays of light as are projected through the slit z. The transmitting and receiving apparatus are preferably so synchronized that the brush g' of the commutator makes a complete revolution around its contacts while the rotary mirror h' is directing the beam of light once across the chamber R. When the current is passing through any one of the cells 1 2 3, &c., which is illuminated, the reflector is held deflected by the attraction of the diaphragm to the magnet, so that the ray of light is directed across the chamber R below the slit z. When a dark cell is in circuit, the increased resistance of the selenium-cell causes a diminution of the current passing over the line-wire, and the magnet thus attracts its diaphragm less strongly, and the latter moves outwardly, with the effect of tilting the mirror upwardly. This elevates the ray of light, so that it rises and enters the slit z, thus making a dot on the photosensitive surface at a position which corresponds to that of the darkened cell in

the chamber B, and hence to the position of the dot on the message which affected such cell.

The ray of light enters the slit *z* as many times during its passage along the slit as there are darkened cells in the transmitting device, and therefore reproduces upon the photosensitive surface each of the dots in the section of the message in their correct positions. As the carrier K rotates one-third of a millimeter to transmit the next succeeding section of the message the photosensitive surface also moves the same distance to receive such section. The succeeding sections follow one another closely, and thus effect a substantially continuous reproduction of the message.

My present invention provides a novel means for leading the vertically-moving ray of light along the slit *z* of the chamber R in lieu of employing the polygonal mirror *h'*. The preferred construction of my invention is shown in Figs. 3 to 5.

In carrying out my present invention I provide a shaft h^2, which rotates synchronously with the shaft *t* of the commutator A, this synchronous rotation being effected in any well-known manner. The shaft h^2 carries a disk h^3, which is formed with an annular cam or screw surface, as shown. A lever h^5 is pivoted upon a shaft h^6, and one end of this lever bears against the cam-surface of the disk h^3, being held in contact therewith by a spring h^4 or in any other suitable manner. The mirror h^7 is connected to and moves with the lever h^5 during the displacement of the latter by the cam.

In Fig. 5 is shown the relative arrangement of the receiving-station when constructed in accordance with my present invention. A ray of light emanating from the source L^2 falls upon the vibrating reflector *d'*, which directs it upon the mirror h^7, preferably at a point near the pivotal axis of the latter, as shown in broken lines. As the reflector *d'* is vibrated under the influence of the electric impulses from the transmitting-station the mirror h^7 swings upon its axis and leads the ray of light along the slit *z* of the chamber R. When any one of the cells 1 2 3, &c., is darkened by the message, as before described, the ray of light rises and enters the slit *z*, thus making a dot upon the photosensitive surface. By reason of the snychronous rotation of the shaft h^2 with the shaft of the commutator A such dot will correspond in position to that of the dot of the message which produced it. The cam-surface of the disk h^3 is so proportioned that when it has swung the mirror to the required extent the lever h^5 reaches the end of the cam and drops off the abrupt end thereof, so that the mirror h^7 is suddenly swung back to its initial position by the tension of the spring, thus directing the ray of light against the opposite side of the chamber R and again begins its movement to lead the ray along the slit *z*. This retraction of the mirror takes place so rapidly that it does not affect the photographic record.

If desired, the action of the mirror h^7 may be prevented during its retractile or return movement by cutting off the ray of light during such movement or in any suitable manner. A simple means for accomplishing this result is shown, which consists of a shield h^8, fixed to the shaft h^2 in such position relatively to the cam h^3 that it is moved between the reflector and the mirror at the instant the latter is retracted.

The photosensitive surface may be moved by the shaft h^2, as in the construction shown in Fig. 6, by a suitable belt *r'*, which acts to rotate the roller *t'*. The belt is crossed, so that it may move the film in the appropriate direction.

In Fig. 6 I have shown a modified construction in which the disk h^3, instead of being formed with the screw or cam-surface shown in Figs. 3 to 5, is formed on its periphery with a spiral or snail cam. In this construction the shaft h^2 will be appropriately arranged relatively to the mirror.

What I claim is—

1. In a facsimile telegraph, a receiving instrument having a swinging mirror for receiving light from a vibrating member, a cam for swinging said mirror, and means for moving said cam to impart a regular swinging movement to said mirror.

2. In a facsimile telegraph, the combination of a vibrating member, a mirror receiving a ray of light from said vibrating member, and moving it across a surface, means for moving said mirror at one rate of speed, and means for moving said mirror to a position where it can again move said ray of light across said surface, said last-named means acting to move said mirror at a greater speed than said first-named means.

3. In a facsimile telegraph, a receiving instrument having a swinging mirror receiving a ray of light from a vibrating member, means for swinging said mirror in one direction at one speed, and means for returning it to its original position at a faster speed.

4. In a facsimile telegraph, a receiving instrument having a swinging mirror, for receiving light from a vibrating member, means for swinging said mirror, means for returning it to its original position, and means for preventing the action of said mirror during its return.

5. In a facsimile telegraph, a receiving instrument having a swinging mirror, for receiving light from a vibrating member, means for swinging said mirror, means for returning it to its original position independently of such swinging, and a shield for preventing the action of said mirror during its return.

6. In receiving apparatus for telegraphing, the combination with a photosensitive surface, a source of light, a vibrating reflector, and a magnet for vibrating it, of a mirror receiving light from such reflector, and means

for swinging said mirror at regular intervals to move said oscillating ray of light across said surface.

7. An apparatus for facsimile telegraphing, comprising a transmitting apparatus, consisting of a series of selenium-cells, means for projecting the message upon said cells, and means for sending current impulses through said cells successively, and a receiving apparatus consisting of an electromagnet adapted to be energized by said current impulses, a reflector vibrated by said electromagnet, and moving a ray of light, a photosensitive surface, and a swinging mirror receiving a ray of light from such reflector, and leading it across said photosensitive surface, at regular intervals, synchronous with the recurrence of the successive transmissions of light through said series of cells at the transmitter.

8. In a facsimile telegraph, the combination of an opaque screen having an edge, a sensitive surface beyond said edge, a rapidly-vibrating member adapted to move a ray of light across the edge of said screen and said sensitive surface, and a swinging mirror adapted to lead said oscillating ray of light along said edge.

9. In a facsimile telegraph, a receiving instrument having a swinging mirror h^7, a lever h^5 connected to said mirror for operating it, a disk h^3 formed with a cam-surface for moving said lever, a shaft h^2 adapted to move synchronously with the shaft of the commutator of the transmitting-station, and a spring h^4 adapted to hold said shaft h^2 in contact with the cam-surface of the disk h^3, whereby upon rotation of the shaft h^2 the lever h^5 will act to swing said mirror h^7, until said lever reaches the end of the cam-surface upon said disk, whereupon it is suddenly retracted under the operation of its spring h^4, and again commences its swinging movement.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

ANTON POLLAK.

Witnesses:
FRED WHITE,
THOMAS F. WALLACE.