

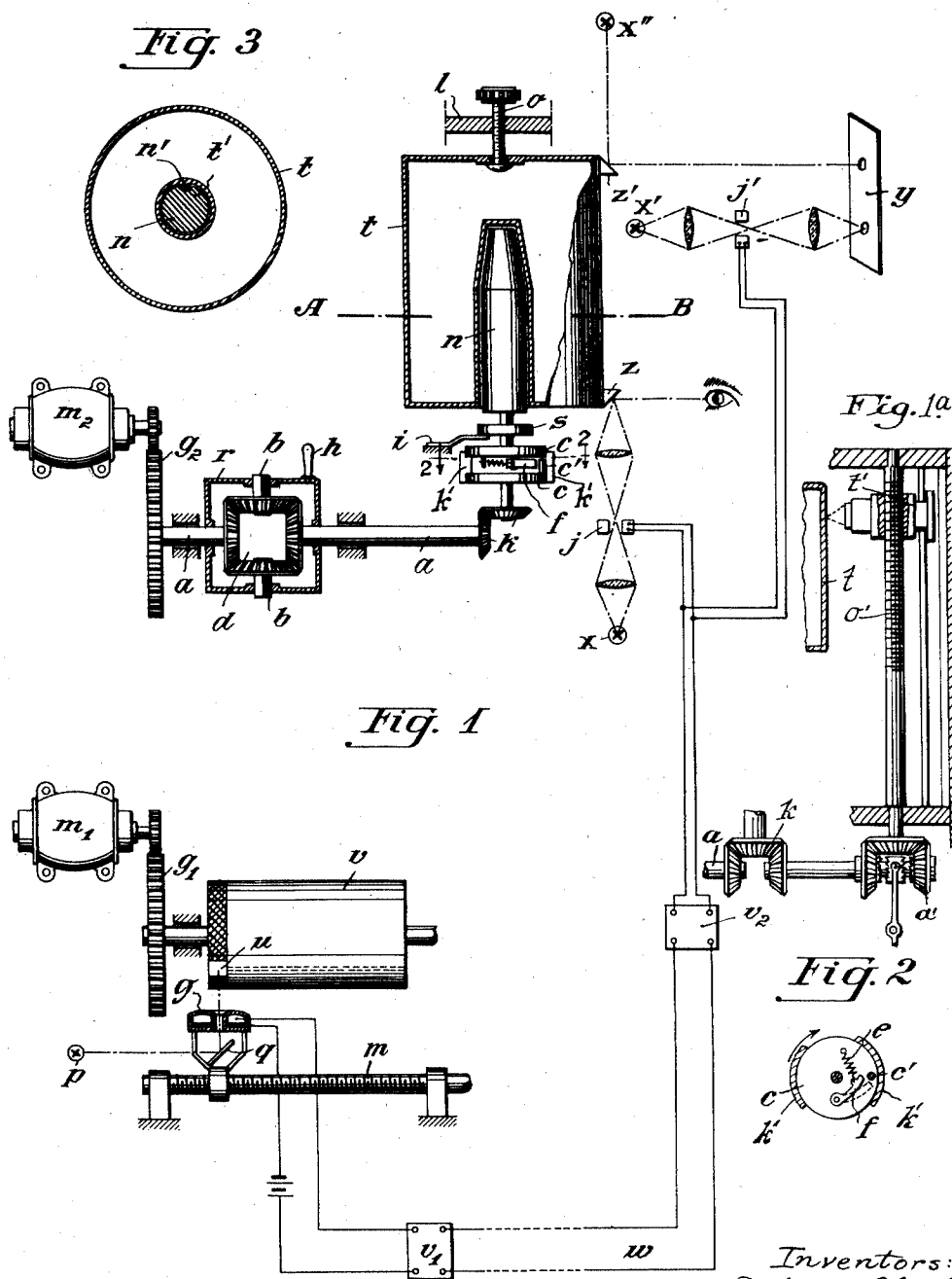
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IMAGE DRUM ARRANGEMENT FOR THE TRANSMISSION OF IMAGES

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IMAGE-DRUM ARRANGEMENT FOR THE TRANSMISSION OF IMAGES.

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This invention relates to an arrangement for apparatus for the transmission of images, and more particularly to improvements in the construction of the image drums at the transmitting and at the receiving stations. The image drum constructions hitherto known, are generally such that they are connected directly through a toothed wheel gear to the synchronized driving motor. The drawback of this is that before each individual transmitting operation, the driving motor has to be started again, and accordingly the steps for synchronizing the motors and for the adjustment of the phase coincidence in the movement of the two drums have to be taken again. The working of the apparatus is thus rendered complicated, and the apparatus becomes unsuitable for heavy traffic.

The essence and the object of the invention consist in limiting to a minimum the steps for the synchronizing and phase adjustment, so that they do not cause any reduction of the speed of working compared to the hitherto already attained very short times of transmission proper, and render the construction eminently suitable more particularly for long continued operation during which as many individual transmissions are to be effected as possible.

This is achieved according to the invention by connecting the synchronized driving motor or the toothed wheel gear directly connected to the same, to the spindle of the drum by a slip clutch (friction, magnetic or other suitable clutch), owing to which the drum can be disconnected from the motor after each individual transmission, at the transmitting as well as at the receiving end, and provided with a new image or film, whilst the motors still continue to run, and do not have to be reset either at the beginning or at the end of each individual transmission, but only once at the beginning of the transmission of a whole series.

Moreover, by using a centrifugal clutch or coupling connected to the friction clutch or other slip clutch, which after the driving of the drum spindle by the motor spindle has taken place, converts the slip coupling into a positive coupling or direct drive owing to the snapping in of a driver lever, at

the moment when the speed of the two spindles is practically identical, and at a given position of the two spindles relatively to each other, the result is obtained that the phase adjustment of the image, that is to say the identical adjustment of the image joints or seams on the two drums, will likewise be necessary only at the beginning of a whole series of transmissions.

The adjustment or setting of phase coincidence of the two image drums is preferably effected by providing on the transmitter drum, at a given point, preferably at the place of its image joint, a bright (or a dark) mark which at each rotation illuminates (or darkens) once the cell sensitive to light and thus sends each time a current impulse into the receiver apparatus, the drum of which is brought into phase with the transmitter drum as regards the position of their image joints, by a control method which will be more fully explained hereinafter, preferably by means of a differential gear.

The image drum proper is preferably not rigidly secured to the drum spindle, but the drum spindle is made into a cone on which is placed the drum with the image or with the film contained in a holder, care being taken by means of a groove in the cone with which engages a pin or other projection of the drum, that the drum and the cone shall always have the same position relatively to each other when in coupled relation.

The working of the described arrangement is substantially facilitated by arranging the drum (and preferably also the motor) vertically and placing it on the cone of the spindle from the top. The shifting of the optical device, that is to say of the cell sensitive to light, and of the ray of light in the transmitter, and the modulated ray of light in the receiver, relatively to the image drum, is effected preferably in such a manner that in each case the image drum is held stationary during the shifting or adjustment, and the optical device is moved on a spindle in front of the drum, only a single passage of the optical device in one direction in front of the drum being required for each transmission.

Another improvement of the arrangement consists in mounting on the drum spindle an

adjustable friction brake which prevents backlash of the toothed wheels of the gear.

A construction according to the invention is shown in a detailed manner in the accompanying drawing in which Figure 1 shows diagrammatically the transmitting and the receiving device, the latter having the described coupling arrangement between the motor and the drum, and both stations being connected to each other by the electro-optical device for the adjustment of phase coincidence of the two drums.

Fig. 1^a is a partial view showing the receiving drum and the optical device associated therewith.

Fig. 2 shows a special detail of Fig. 1 and is a section along the line 2—2 thereof.

Fig. 3 is a cross section along line A—B of Fig. 1.

In Fig. 1 m_2 is the synchronized motor at the receiving end driving the drum t , which motor by means of gearing g_2 drives the main spindle a , a of the differential gear d . The second spindle b , b of this differential gear is adjustable by means of a frame r on which is mounted a lever h , movable in the plane at right angles to the plane of the drawing, for the purpose of adjustment, and produces thereby a phase displacement or a phase regulation between the two sections of the main spindle a , a . The spindle b , b could be preferably rotated also by means of a separate wheel, instead of by means of the lever h . At the end of the spindle a , a is mounted a bevel wheel gearing k which drives the vertical drum spindle. c , c indicates part of a friction clutch, which includes friction elements such as friction flanges k' projecting upwardly from the lower disk c into frictional engagement with the upper disk. (Fig. 2.) If desired, a magnetic or other slip clutch may be employed. The driving disc of the slip clutch or friction clutch is provided at its edge with a projection c' —see Fig. 2—with which a block or lever f provided on the driven disc engages as soon as the latter connected to the drum, has practically the same speed as the driving disc, and thereby the slip coupling is converted into a mechanical one or direct drive. This is effected by means of a spring e which at low speeds pulls the lever f towards the centre and is so dimensioned that at the required speed centrifugal force will throw the lever out to the position shown by dotted lines in Fig. 2, so that the lever will be in the path of the projection c' of the lower disc, and both discs will rotate in unison, in the direction indicated by the arrow, as soon as the pin c' engages the free end of lever f . The upper disc of the friction clutch is rigidly secured to the spindle of the image drum which spindle is provided with a brake disc s with which engages a brake block or a brake spring i .

Owing to this resistance, there will be no backlash in the toothed wheels of the driving mechanism. The drum spindle terminates in a cone n on which is mounted the image drum proper t , the cone n being preferably provided with a groove n' —see Fig. 3—with which engages a projection t' provided on the inner side of the drum t , so that the drum and the cone are always in the same position relatively to each other.

A screw-spindle o' is mounted at the side of drum t parallel to the axis thereof, as shown in Fig. 1^a, and is adapted to reciprocate an optical device t' mounted thereon. The spindle is driven by the shaft a through the reversing mechanism a' .

The transmitting end consists of a driving motor m_1 which is connected to the receiving motor m_2 by a suitable synchronizing device (not shown), and the image drum v , with a connecting mechanism (not shown) which may embody a differential gear and a friction clutch. In the transmitter, the ray of light coming from the source of light p , strikes a mirror q which is movable together with the photo-electric cell g on a spindle m and is arranged at an angle of 45° ; this mirror reflects the said ray towards the image drum v . For the purpose of phase adjustment, the optical device mounted on a nut or carrier adjustable on the spindle is first brought to a point opposite the edge of the drum on which, preferably at the place of the image joint, is provided a bright mark u . At each passage in front of the optical device, the cell is lighted for an instant by the said mark, owing to which current impulses will be produced in the circuit controlled by the cell, which impulses will be sent through the transmitter wire w (or by wireless) and the amplifiers v_1 and v_2 into the receiving apparatus. In the latter is arranged the receiving light source x , the light of which is controlled by the light relay j excited by the incoming currents. At the edge of the receiving drum t is provided, in registry with the image joint, a mirror z which, at each revolution, passes once through the extended axis of a lens or of a system of lenses which is situated in the path of rays of the lamp x directed lengthwise of the drum axis, the mirror being inclined at an angle of 45° relatively to the ray of light. When looking on the moved mirror from the side in the manner shown, the flashes of light of the source of light x will be perceived only when the mirror z is situated, at the moment of the current impulse, exactly in the position shown in the figure, that is to say in alignment with the lens axis. The phase adjustment to produce this result is then effected by changing, during the observation, the position of the auxiliary spindle b , b of the differential gear, and thereby the

drum motion is altered as regards its phase relatively to the rotation of its driving device, until the light flashes of the lamp x become visible in the field of the image.

5 In such a case, the image joints of the two drums will pass in front of the corresponding optical device at exactly the same moment. Instead of the differential gear, the stator of the synchronous motor could be rotated.

10 For slow rotations of the drum, the receiving apparatus could be modified by omitting the mirror z , the light relay j , and the source of light x , and by substituting for them, a light relay j' and a control lamp x' , and in line with the image joint of the drum spindle, a mirror z' on the drum t which at each revolution projects for a moment the light beam of an auxiliary lamp x'' on a screen y or the like. When the light flashes of the control lamp and of the auxiliary lamp, which are both projected on the screen y next to each other, appear simultaneously, the phase adjustment is correct.

25 The image drum t may be disconnected from the driving disc a by lifting the drum with the driven disc c at the end of a transmitting operation. This is preferably effected by means of a coarse-threaded screw o extending loosely through the top of the drum t so that the latter may rotate on the screw, the latter being normally stationary. The screw o is threaded into a suitable stationary part l and has a head below the top of the drum t and a knob above said part l .

30 Thus by turning the screw so that it will move up, the drum t will be lifted with the cone n and upper disc c so as to release the latter from the lower disc c .

35 What we claim as our invention and desire to be secured by Letters Patent is:

1. In a system for the electrical transmission and reception of images, the combination of an image drum, a synchronized motor for rotating said drum, a slip clutch interposed between said drum and said motor, and means for changing the slip drive of said clutch into a positive drive at the moment the rotary speed of said drum becomes substantially equal to that of the driving member of said clutch.

2. In a system for the electrical transmission and reception of images, the combination of an image drum, a synchronized motor for rotating said drum, a slip clutch interposed between said drum and said motor, and means for changing the slip drive of said clutch into a positive drive at the moment the rotary speed of said drum becomes substantially equal to that of the driving member of said clutch, the positive drive always becoming operative at a predetermined position of the drum relatively to said driving member.

3. In a system for the electrical transmis-

sion and reception of images, the combination of an image drum, a shaft on which said drum is mounted detachably, a second shaft, a synchronized motor for driving said second shaft, a differential gear interposed between said motor and said second shaft, means for the phase adjustment of said drum operatively connected to said gear, a slip clutch and a positively driving clutch, both interposed between said second shaft and the drum shaft, only one of said clutches being effective at any particular time, said positively driving clutch including a member movable under the influence of centrifugal force to replace the slip drive of the first-named clutch with the positive drive of the other clutch at the moment said drum shaft attains substantially the same rotary speed as said second shaft.

4. In a system for the electrical transmission and reception of images, the combination of an image drum having an internal projection, a drum spindle having an external groove to receive said projection, a synchronized motor for driving said drum spindle, a differential gear interposed between said drum and said motor, means for the phase adjustment of said drum, operatively connected to said gear, a slip clutch interposed between said drum and said motor, and means for changing the slip drive of said clutch into a positive drive at the moment said drum shaft attains substantially the same rotary speed as the driving member of said clutch.

5. In a system for the electrical transmission and reception of images, the combination of an image drum, a conically formed drum spindle, said drum and said spindle having companion groove and projection formations, a synchronized motor for driving said drum spindle, a differential gear interposed between said drum and said motor, means for the phase adjustment of said drum, operatively connected to said gear, a slip clutch interposed between said drum and said motor, and means for changing the slip drive of said clutch into a positive drive at the moment said drum spindle attains substantially the same rotary speed as the driving member of said clutch, and a friction brake operating on said drum spindle to prevent back lash of the toothed gearing interposed between said motor and said drum.

6. In a system for the electrical transmission and reception of images, the combination of an image drum, a shaft about which said drum is rotatable, a screw-spindle, an optical device connected to said spindle in such a manner that said device moves along said image drum during the rotation of said spindle, a synchronized motor for rotating said drum, a differential gear interposed between said drum and said motor, means for

the phase adjustment of said drum, operatively connected to said gear, a slip clutch interposed between said drum and said motor in such a manner that it can be
5 coupled or uncoupled during the running of said motor, and means for changing the slip drive of said clutch into a positive drive when the drum shaft attains substantially the same speed as the driving member of
10 said slip clutch.

7. In a system for the electric transmission of images from one station to another, the combination of an image drum, at each of said stations, a shaft about which said
15 drum is rotatable, a second shaft, a synchronized motor for driving said second shaft, a slip clutch and a positive drive clutch, both interposed between said second shaft and the drum shaft, only one of said clutches
20 being effective at any particular time, said positively driving clutch including a mem-

ber movable under the influence of centrifugal force to replace the slip drive of the first-named clutch with the positive drive of
the other clutch at the moment said drum 25 shaft attains substantially the same rotary speed as said second shaft, and a device at the transmitting station for transmitting current impulses to the receiving station in the rhythm of the rotations of said trans- 30 mitting drum, and means at said receiving station for converting the current impulses into flashes of light, said device and said means serving for the adjustment of said image drums. 35

In testimony whereof we affix our signatures.

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