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PHASE CORRECT COUPLING FOR PICTURE TRANSMISSION

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Fig. 1

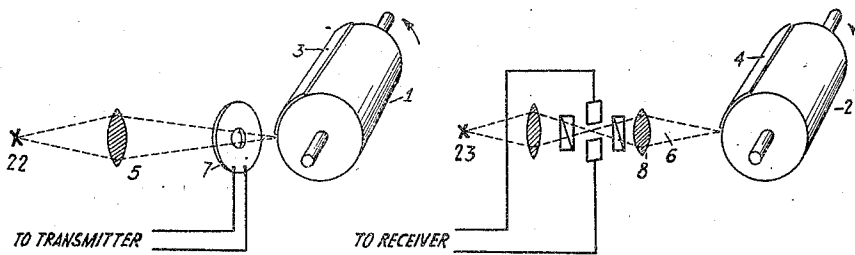


Fig. 2

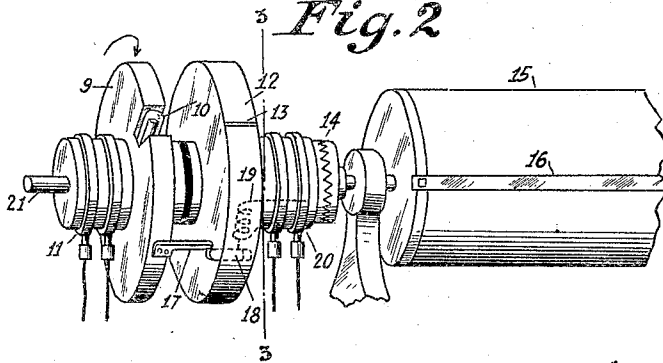


Fig. 4.

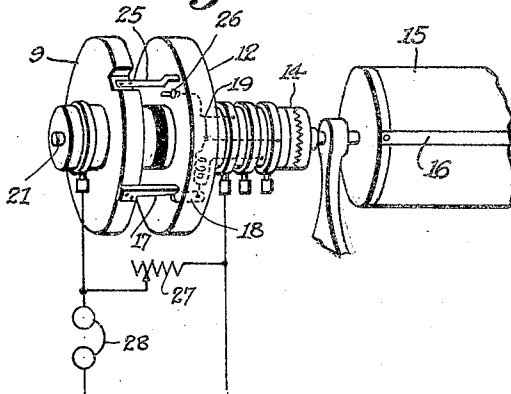
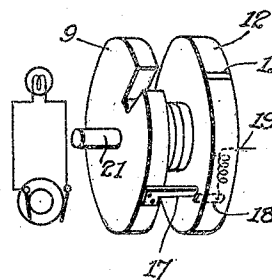


Fig. 3.



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PHASE-CORRECT COUPLING FOR PICTURE TRANSMISSION

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The present invention is concerned with equipment for all kinds of telegraphic work, for instance, for picture transmission or high speed telegraphy, comprising mechanisms or drives rotating in synchronism both at the sender and receiver end. What is primarily concerned in what follows are outfits for picture transmission in which exploration of picture occurs along a helical line by means of cylindrical or drum shaped picture carriers, although the application of the disclosure is not confined to devices of the said sort.

The problem arising in picture transmission by means of synchronously rotating drums is diagrammatically shown by the accompanying drawings, wherein;

Fig. 1 is a diagrammatic representation of a portion of a transmitting and receiving system;

Fig. 2 is one preferred embodiment of a phase-correct coupling according to my invention; and,

Fig. 3 shows a modification of the system shown by Fig. 2, which embodies, however, only the left-hand portion thereof shown as extending to the left of the dotted line 3—3 of Fig. 2; and,

Fig. 4 shows a still further modification of the arrangement of Fig. 2, and illustrates in particular a system by which the phase adjustment is made in accordance with an audible signal.

To now refer to the drawings, and particularly to Fig. 1, the point is that the receiver drum 2 should not only rotate in synchronism with transmitter drum 1, but that the drum 2 should also be at the proper phase relationship, or, in other words, the position of the holding strips 3 and 4, known as the "dead picture angle", provided for the picture surface must be identical with respect to the light sources at the transmitter and receiver, and when referred to identical points about the periphery of the picture drums 1 and 2, 3 and 4 must run at the same phase.

In apparatus for high speed telegraphy the analogous demand would have to be made that the types on the periphery of the

type wheel must be at the proper relative position both at the transmitter and at the receiver. For instance, if in picture transmission an exploring light pencil 5 issuing from a source 22 in the transmitter in conjunction with a photo-electric cell 7 is used, and at the receiving end a similar light pencil 6 from a source 23 in conjunction with a light control optical means 8 is used for photographic recording, it will be seen that the holder strips 3 and 4 must enter the zone of the light pencil at the same instant. This is necessary lest the image of strip 3, which would be included in the transmission, would somewhere fall into the incoming picture produced on drum 2.

Picture transmission is usually effected in such a way that the receiver apparatus is governed by the transmitter. From the sender an impulse or phase signal is sent out which indicates the passage of the holder strip 3 through the light pencil, and the coupling of picture drum 2 at the receiver with the driving mechanism running in synchronism with the sender must then take place by coupling means in a definite position at which 3 and 4 rotate at equal phase with reference to the corresponding light pencils or other exploring means. To solve the problem of the phase-correct coupling in picture transmission a number of different devices are in use, and most of these are based upon the fact that a slip clutch is provided and that the receiver drum is allowed to slip with relation to the transmitter drum until an indicator, such as a glow-discharge lamp, indicates phase coincidence of the holder strip 3 in the sender and the holder strip 4 in the receiver drum. At that very instant the coupling is made rigid and picture transmission can be started.

The present invention solves the above problem by ways and means by which a particularly safe adjustment of the proper phase is insured in schemes comprising a stationary drum for the incoming picture. One embodiment of the idea is shown by way of example by Fig. 2, which, however, is not limiting for the construction, but is merely shown to illustrate the coaction of all parts. Making direct reference to Fig. 2, 15 is the receiving

picture drum comprising holder strip 16 for the recording surface. As stated, drum 15 in making phase adjustment is resting relative to the driving shaft 21 in synchronism with the transmitter apparatus. Recessed in a notch about the circumference of a disc 9, corevolving with shaft 21, is a glow-discharge lamp 10 which is supplied with current by way of slip rings 11 from the receiver, and which is caused to flash up during initial running or idle running of the picture drum 1 of the sender every time that the holding strip 3 passes through the zone of the exploring light pencil. Hence, disc 9 indicates the said instant and thereby the angular position of the securing strip in the sender drum. Upon the shaft of the picture drum 15, being first stationary, there is seated a disc 12, revolvable relative to 15, upon unlocking lock 14. The said disc 12 bears a peripheral mark 13 which will be hereinafter described. Built into disc 12 is an electromagnetic clutch 18, 19, which receives energizing current by means of slip ring device 20. The said coupling device operates in this manner, that upon switching in the current a lug 18 is caused to project, and is adapted to drive disc 12 and the drum 15 attached thereto by means of a tappet 17 provided on the disc 9.

For the time being, the clutch 17, 18 shall not be assumed to be engaged. For the purpose of phase adjustment, the disc 12, while lock 14 is opened, is turned until mark 13 comes to the point about the circumference which coincides with the flashing of the glow-discharge lamp 10. The drum 15 is then locked in the position as shown, in which the holding strip 16, corresponding to 4 of Fig. 1, is located in the zone of the photographic ray pencil for picture recording. After disc 12 has been brought in the said position, and after the lock 14 has been reengaged, whereby 12 and 15 have again been made non-rotatable with reference to each other, the clutch device 18, 19 is energized with current, care being thus taken that upon the next impact between finger 17 and lug 18 it will be carried along conjointly with drum 15 at the proper phase relation. In this manner phase-correct coupling of 15 and driving shaft 21 is effected by positive means, and this state is permanently preserved in invariable synchronism with the picture drum sender. For disengagement, all that is necessary is to interrupt the current in the clutch. For repeated use of the receiving drum, all that is necessary in any case is to disengage the mechanical clutch 18, 19 without necessitating renewed phase adjustment, of course, presupposing permanent synchronous running of shaft 21.

In practising the invention, all such mechanical and constructional elements may be used as may be found most convenient for the

different purposes of an arrangement as described. Also the sequence of the parts shown need not necessarily be as illustrated in the drawing; indeed, their places may be changed to suit practical conditions.

Instead of the revolving glow-discharge lamp 10, also a setting mark may be used which is illuminated by a stationary glow-discharge lamp as shown by Fig. 3 or by a plurality of stationary glow-discharge lamps working simultaneously and distributed about the periphery. The said mark could also be replaced by an illuminated slit in such a manner that the slot 10a of Fig. 3 may replace the mark 13. Furthermore, instead of the optical adjustment, also acoustic adjustment of the phase angle as shown by Fig. 4 could be adopted in an analogous way. This could be done, for instance, by so arranging the transmitter that it indicates the phase of the holding strip 3 by a sound sent to the receiver. At the receiver a contact 25 is provided on the disc 9 to replace the glow-discharge lamp 10. Another contact 26 taking the place of mark 13 is provided upon the disc 12. This contact may have the form of a sliding bow, which in case of phase coincidence between transmitter and receiver comes in touch with the contact taking the place of lamp 10. By way of the said contacts 25 and 26 (of course, in conjunction with slip rings similar to those shown by Fig. 2) there is conducted the setting signal coming from the transmitter. The setting device is suitably chosen so that in parallel to both contacts 25 and 26 there is inserted a resistance 27 to weaken the signal, so that in case a note is transmitted the same can be heard in the telephone 28, although faintly, once upon each revolution. At the instant when by turning disc 12 the contacts engage so that the proper phase adjustment is performed, the said note or sound is heard audibly because the shunt resistance 27 is now short circuited. The reading of the sound is effected most suitably by the aid of a telephone or loud speaker device 28.

Another modification of the basic idea of the invention consists in that by way of a contact arrangement, as hereinbefore described, for acoustic phase comparison, a current is caused to flow which actuates an optical indicator, a current indicator, or the like which is to be substituted for the telephone receiver 28 and connected in the same manner.

Instead of insuring phase setting in a way as before described on the basis of phase indicators by hand, such adjustment could also be performed automatically, for instance, the turning of the element corresponding to disc 12 could be effected by an auxiliary motor which is controlled by the current indicator instrument before referred to. By such an

arrangement there is no structural difference over the showing in Fig. 4, except that the disk 9 is loosely mounted on shaft 21 and is driven from a separate source which, in well known manner, is controlled by incoming signal energy.

Having thus described my invention, I claim:

1. A system for correcting the phase adjustment of a transmitter and receiver drum for picture telegraphy systems which includes means for driving the drum of a picture receiving system in synchronism with a corresponding element of a transmitter system, means for stopping the rotation of the receiving drum during periods when phase adjustments thereof are to be made, means for adjusting and coordinating the phase of the receiver drum with that of the transmitter while said receiver drum is stationary, and means for positively driving and starting the receiver drum from a stationary position after proper phase adjustments have been made.

2. A system for correcting the phase adjustments of a rotatable recording drum at the receiver in a picture telegraphy system which includes means for driving the receiving drum at a speed corresponding to that of a corresponding element of a transmitter, clutch means for dis-engaging the receiving drum from the associated drive means and stopping the rotation of said drum, means connected with the driving element for said drum for indicating the phase relationship of a corresponding element of a transmitter, means for rotatably moving said receiving drum while in an unlocked position to coordinate the phase thereof with that of the transmitter element and means for positively driving the said receiving drum after proper phase adjustments thereof have been made.

3. A phase correcting coupling arrangement for receiving and transmitting systems including a transmitting system and a receiving system which comprises a rotating receiving system, a driving means for said system, means for unlocking said receiving system with respect to said drive system, means for producing an indication of the phase of said transmitting system, means for phaseally coordinating said receiving system with the indication of the phase of said transmitting system when said receiving system is in an unlocked position, and means for positively driving said receiving system with respect to said transmitting system after said phaseal adjustments are made.

4. A phase correcting coupling arrangement for picture transmitting and receiving systems including a transmitting arrangement and a receiving arrangement which comprises a rotary picture receiving drum, a driving means for rotating said drum at a

speed synchronous with that of said transmitting arrangement, means for unlocking said receiving drum with respect to said drive system, means for producing a visible indication of the phase angle of rotation of said transmitting arrangement, means for adjusting the phaseal position of said receiving drum when in an unlocked position with respect to said indication of said transmitting arrangement and means for positively driving said receiving drum in a cophasal relationship with respect to said transmitting arrangement after said receiving system has been adjusted with respect to phase and returned to a locked position with respect to the driving means therefor.

5. A phase correcting coupling for picture transmitting and receiving arrangements which include a transmitting and a receiving system each provided with rotatable picture carrying drums comprising means for driving the picture receiving drum at a synchronous speed with respect to said transmitting drum, means rotating with said receiving drum for producing a visible indication of the phase angle of said transmitting drum with respect to a predetermined point, means for unlocking said receiving drum with respect to the drive means therefor, means for shifting the phase angle of said receiving drum when in said unlocked position and for coordinating the phase angle thereof with respect to the phase angle as indicated by said visible indicator and an electromagnetic clutch mechanism for positively driving said picture receiving drum when said receiving and transmitting systems are coordinated with respect to phase adjustments.

6. The method of correcting the phase adjustment of receiving and transmitting systems in picture telegraphy and a receiving system including a rotatable picture recording drum which comprises rotating the receiving element at a speed synchronous with that of a like transmitting element, unlocking the said element with respect to the driving force, producing at the receiver a visible indication of the phase position of rotating a like element at the transmitter, adjusting the receiving element to a corresponding phase relationship with the transmitter, and positively and synchronously driving the receiving element after adjusting the phase position thereof.

7. A phase correcting coupling arrangement for facsimile transmitting and receiving systems which include a transmitter and a receiver comprising a rotatable recording element for recording pictures, a driving means for said recording element operating in synchronism with a corresponding drive element of a transmitter, means for unlocking the said picture recording element with respect to the drive therefor, means connected with the said synchronous drive element for producing a visible indication of the

phase relationship of said transmitting system, means for coordinating the phase relationship of the recording element while in said unlocked position, and means for positively locking said synchronous drive means
5 with said recording element at a period when the said element has been phaseally coordinated with a corresponding element of the transmitter.

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