

May 31, 1932.

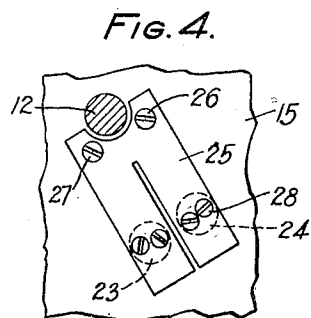
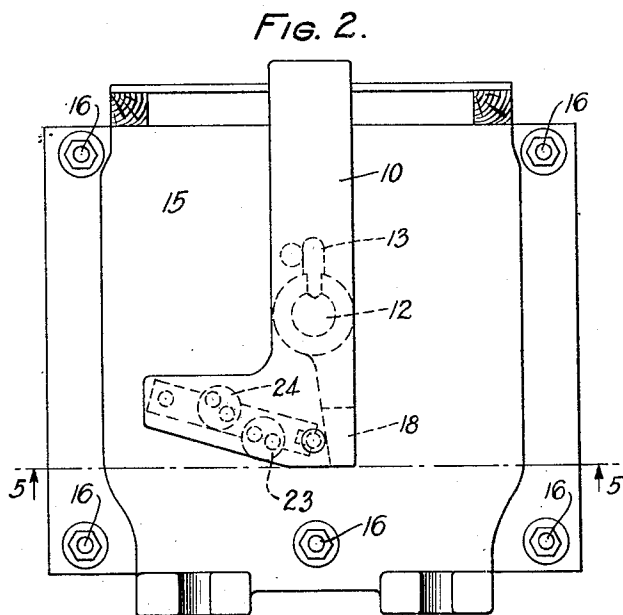
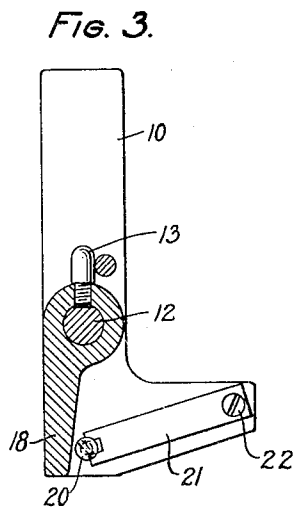
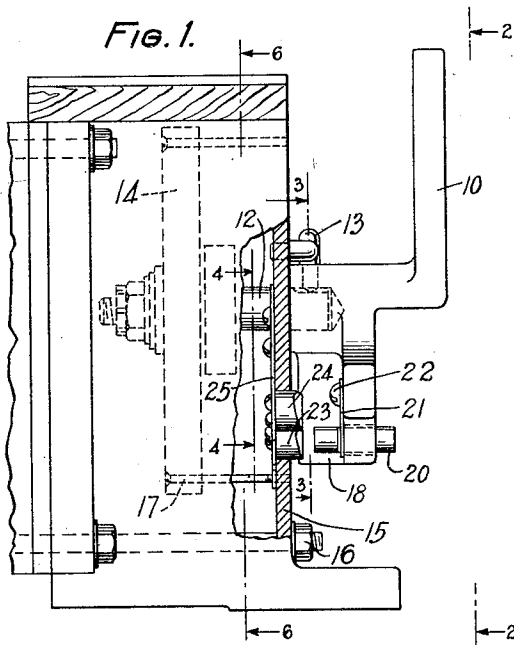
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1,861,204

ELECTRICAL CONTROLLER SYSTEM

Filed May 24, 1930

2 Sheets-Sheet 1



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FIG. 5A.

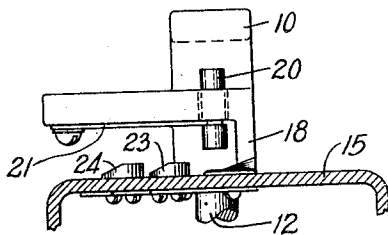


FIG. 5B.

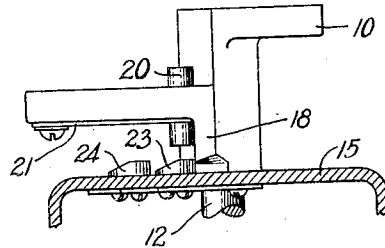


FIG. 6.

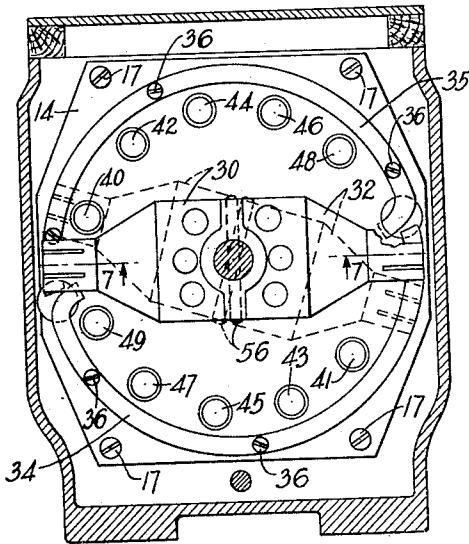


FIG. 5C.

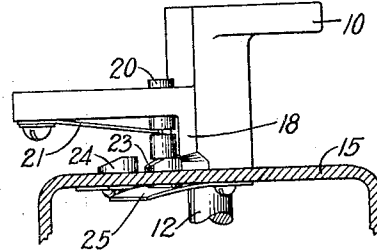
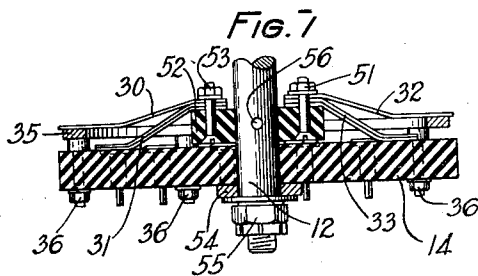
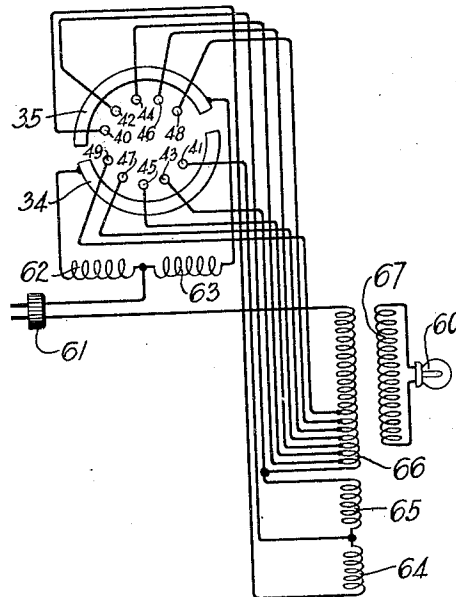


FIG. 8.



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ELECTRICAL CONTROLLER SYSTEM

Application filed May 24, 1930. Serial No. 455,445.

This invention relates to control systems and more particularly to a device for checking the movement of a controller arm.

Various types of checking devices for controllers have been provided in electrical systems for preventing too rapid increase in the application of current to electrical devices. Some of such known devices employ a complicated mechanism comprising a series of magnets controlled by current as it is built up in the windings of said magnets when connected in circuits extending through the controller contacts for positively preventing destructive surges of current. Other known devices comprise latches for the controller arm which are designed to prevent too rapid movement of the arm but which are capable of being moved rapidly if an operator desires such operation. In a majority of the latter devices a spring latch is operable at the controller arm when this arm is in any of its various positions and the arm may be freely moved over positions at which it would ordinarily be stopped. In certain electrical systems a controller, which can only be manipulated in a manner to prevent current surges, is required although such electrical system may be of a nature which would not warrant the use of a complicated mechanism.

The object of this invention is therefore to provide a simple checking device for multi-position circuit controllers which may be released for movement of the controller arm only when said controller arm is abutting the checking device.

One embodiment of the present invention comprises a transformer arranged to reduce 110 volts alternating current for lighting a 30 volt, 900 watt projection lamp in a sound film reproducing system in which the windings of the transformer are connected to multi-position controller contacts preferably attached to said transformer. The movement of the controller arm must be carefully regulated in order to prevent destruction of this lamp which has a filament of negligible resistance until it has been heated. Therefore, a device is provided which positively insures a momentary stop at certain of the contacts

to which the transformer windings are connected. During this momentary stop the filament becomes sufficiently heated to permit advancing the controller arm to the next contact. For this purpose a spring controlled detent is located in the head of the transformer casing. This detent is not connected in any way to the controller arm and is only operable after the controller arm has abutted the detent. A manually operable spring released button is attached to and carried with the controller arm so that when the controller abuts the detent this button may be depressed for moving the detent downwardly in order to permit further movement of the controller arm.

Referring to the illustrated embodiment, Figs. 1 and 2 show the controller arm mounted in position on the end of a transformer casing. Fig. 3 shows details of the controller arm and Fig. 4 the spring arrangement for the controller arm latching mechanism.

Three views of the controller arm have been shown in Fig. 5, *a*, *b*, and *c* to properly illustrate the method of operating the controller arm stops or latches.

Figs. 6 and 7 show the contact head and switching arrangement operated by the controller arm and Fig. 8 shows the transformer coils as associated with the contacts of Fig. 6.

The disclosure to be described herein has been chosen as the controlling apparatus associated with a transformer for supplying current to a projection lamp in a motion picture system. The transformer head is shown in Figs. 1 and 2 with the controller arm attached to shaft 12 by thumb nut 13, thus setting the controller arm in its proper relation to the switch brushes 30, 31, 32 and 33 as shown in Figs. 6 and 7. Fig. 1, further shows the relative position of the contact base 14 to the transformer head 15 and controller arm 10. The contact base 14 is fastened to the transformer head through the agency of screws 17. The controller arm latches or stops 23 and 24 are mounted in the transformer head on spring 25 which is fastened to the inner side of the transformer head by screws 26 and 27 as shown in Fig. 4.

In the specific embodiment disclosed here-
in the purpose of the transformer arm stops
is to prevent too rapid an increase of current
through the filament of lamp 60, shown in
Fig. 8. The plug 61 of Fig. 8 is used for con-
necting the controlling unit and transformer
to a power source. This power source is ex-
tended over one conductor to the upper end
of the primary transformer coil 66, the other
conductor being connected through the
switching contacts. The switch of Fig. 6 is
shown in its normal position in full lines and
in position 1 in dotted lines. It will be noted
that brushes 30 and 32 are alternately associ-
ated with their respective connections as the
switch is advanced. By referring to Fig. 7
it will be noted that separate two section
brushes are shown each side of shaft 12. The
switch brushes 30 and 31 are held in position
on insulating block 52 by bolts 53. The
brushes 32 and 33 are held in position on this
insulating block by bolts 51. The insulating
block is held in position on the shaft through
the agency of pin 56.

Let it now be assumed that the controller
arm 10 is turned from its normal position
for associating brush 31 with contact 40. In
this position of the controller arm extension
18 abuts detent 23. In position 1 with brush
31 resting on contact 40, brush 30 is posi-
tioned upon the metal ring 35. The trans-
former coil 64 which is connected to contact
40 is connected to coil 63 through brushes 30
and 31 which establishes a circuit from one
side of the power source through coil 63,
metal ring 35, contact 40, transformer coils
64, 65 and 66 to the alternate side of said
power source. It might be stated at this time
that transformer coils 64 and 65 are of high
resistance and when placed in series with coil
66 permit a very small current flow through
the secondary transformer coil 67 and thus
establish a very small flow of current through
lamp 60. The resistance of lamp 60 is prac-
tically zero when cold. This resistance, how-
ever, rapidly increases upon the application
of a small amount of current thereto. There-
fore, regardless of the high resistance of coil
64 sufficient current flows through the lamp
to heat it to some extent and increase its
resistance. In order to allow time for the re-
sistance of the lamp to properly advance the
controller arm 10 is latched when brushes
30 and 31 are brought to rest upon termi-
nal 40.

The movement of the controller arm for
advancing the brushes from their normal
position to the first contact is shown in Fig.
5. Fig. 5a illustrates the controller arm in its
normal position with extension 18 a distance
removed from detent 23. Fig. 5b shows ex-
tension 18 of the controller arm abutting de-
tent 23. In this position of the controller
arm the brush 31 is resting on terminal 40.
In order to advance the controller arm for

positioning the brushes upon the next suc-
ceeding contact detent 23 must be pressed
downwardly. This is accomplished by de-
pressing the cylindrical button 20 against the
pressure of spring 21. When this button
comes into contact with detent 23, the detent
is pushed downwardly against the pressure
of spring 25. The operator of the controller
arm may depress the button 20 with his
thumb and at the same time press with the
hand against the controller arm for moving
extension 18 over the top of detent 23. This
operation is best shown by the position of
the cylindrical button 20 and extension 18
in Fig. 5c. It will be noted that the detent
23 has been moved below the bottom edge of
extension 18 and the extension 18 is in posi-
tion for further movement of the controller
arm. The button 20 is then released and the
controller arm moved for positioning brush
33 upon terminal 41 which will be known as
position 2. At this time brush 32 is resting
upon the circular metal ring 34 and the exten-
sion 18 is abutting detent 24.

In position 2 a circuit is established from
the power source through coil 62, circular
metal ring 34, contact 41, primary windings
65 and 66 of the transformer to the alternate
side of the power source. The winding 64 is
thus eliminated from the circuit and the cur-
rent consequently increased in the secondary
transformer winding 67 and in the filament
of lamp 60. Detent 24 is now pressed down-
wardly by the cylindrical button 20 in the
same manner as described for detent 23. The
controller arm 10 is moved so that extension
18 rides over the top of detent 24. The brush
33 is thus moved away from contact 41. Fur-
ther movement of the controller arm asso-
ciates brush 31 with contact 42. In this po-
sition of the switch a circuit is established
from the power source through resistance
winding 63, circular metal ring 35, contact
42, primary winding 66 of the transformer
to the alternate side of the power source.
At this time the filament of lamp 60 has in-
creased sufficiently in resistance to endure
rapid increases in current strength. The
controller arm may, therefore, be rotated
rapidly to a point for properly illuminating
the lamp 60. As the brushes are rotated
under the control of the controller arm a
circuit is alternately established through the
brushes on each side of the shaft 12, each suc-
ceeding position illuminating windings of
the primary coil 66 of the transformer.

Referring again to Fig. 5—a, b and c, it
will be noted that there is not any possible
manner of operation by which the controller
arm may be freely moved through the con-
tact positions at which it should be momen-
tarily stopped. If the cylindrical button 20
is held down by an operator desiring free
movement of the arm, this button will abut
detent 23 if the arm is started from its nor-

mal position or will abut detent 24 if held down after passing detent 23. It would thus readily be found by the operator of an electrical system having this controller arm and latching arrangement, that the arm could be moved through its cycle only by a sequence of operations positively controlled by mechanical devices to establish successive circuits through the contacts associated therewith.

It is apparent that the invention disclosed herein is applicable to many systems and should not be limited to the specific embodiment shown.

What is claimed is:

1. In a controller, a rotatable arm and hub member arranged to operate said controller, a secondary member connected to said hub member in a different radial position than said arm and rotatable therewith, a spring supported resilient detent mounted in the face of said controller for arresting the rotation of said arm and hub member, a fixed extension on said secondary member arranged to abut said detent, and a push button on said secondary member free to operate at all times but only effective for pushing said detent out of the path of said extension when said member has been rotated to a point where said extension abuts said detent.

2. In a controller, a rotatable arm and hub member arranged to operate said controller, a secondary member connected to said hub member in a different radial position and on a different horizontal level than said arm, said secondary member being rotatable with said arm and hub member, a spring supported resilient detent mounted in the face of said controller for arresting the rotation of said arm and hub member, a fixed extension on said secondary member arranged to abut said detent, and a push button on said secondary member free to operate at all times but only effective for pushing said detent out of the path of said extension when said member has been rotated to a point where said extension abuts said detent.

3. In a controller, a rotatable arm and hub member arranged to operate said controller, a secondary member connected to said hub member in a different radial position than said arm and rotatable therewith, a plurality of spring supported resilient detents mounted in the face of said controller, each so constructed as to stop the movement of the arm and hub member when rotated in one direction and permit free rotation of the arm and hub member in the opposite direction, a fixed extension on said secondary member arranged to abut said detents when said member is moved in one direction and slide over said detents when moved in the opposite direction, and a push button on said secondary member free to operate at all times but only effective for pushing said detents out of the

path of said extension when said member has been rotated to a point where said extension abuts a detent.

In witness whereof I hereunto subscribe my name this 12th day of May, 1930.

JOHN A. BERRIAN.

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