No. 715,702. Patented Dec. 9, 1902.

R. F. SPANGENBERG.

SYSTEM OF AND APPARATUS FOR CONTROLLING LIGHT EFFECTS.

(Application filed Nov. 18, 1901.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.

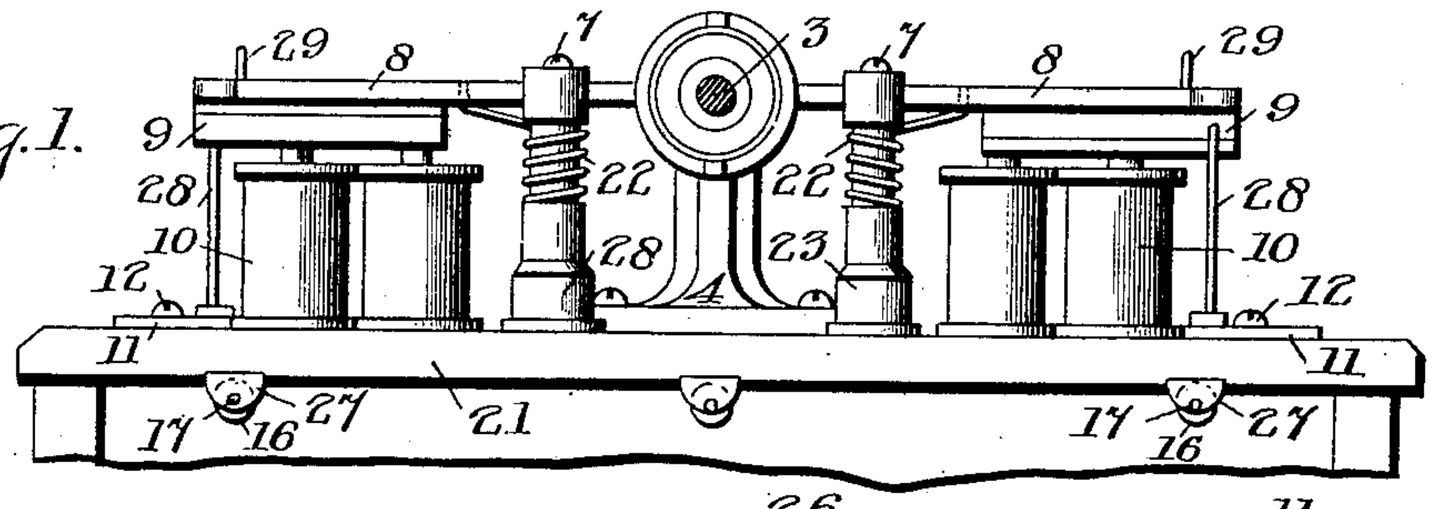

Fig. 2.

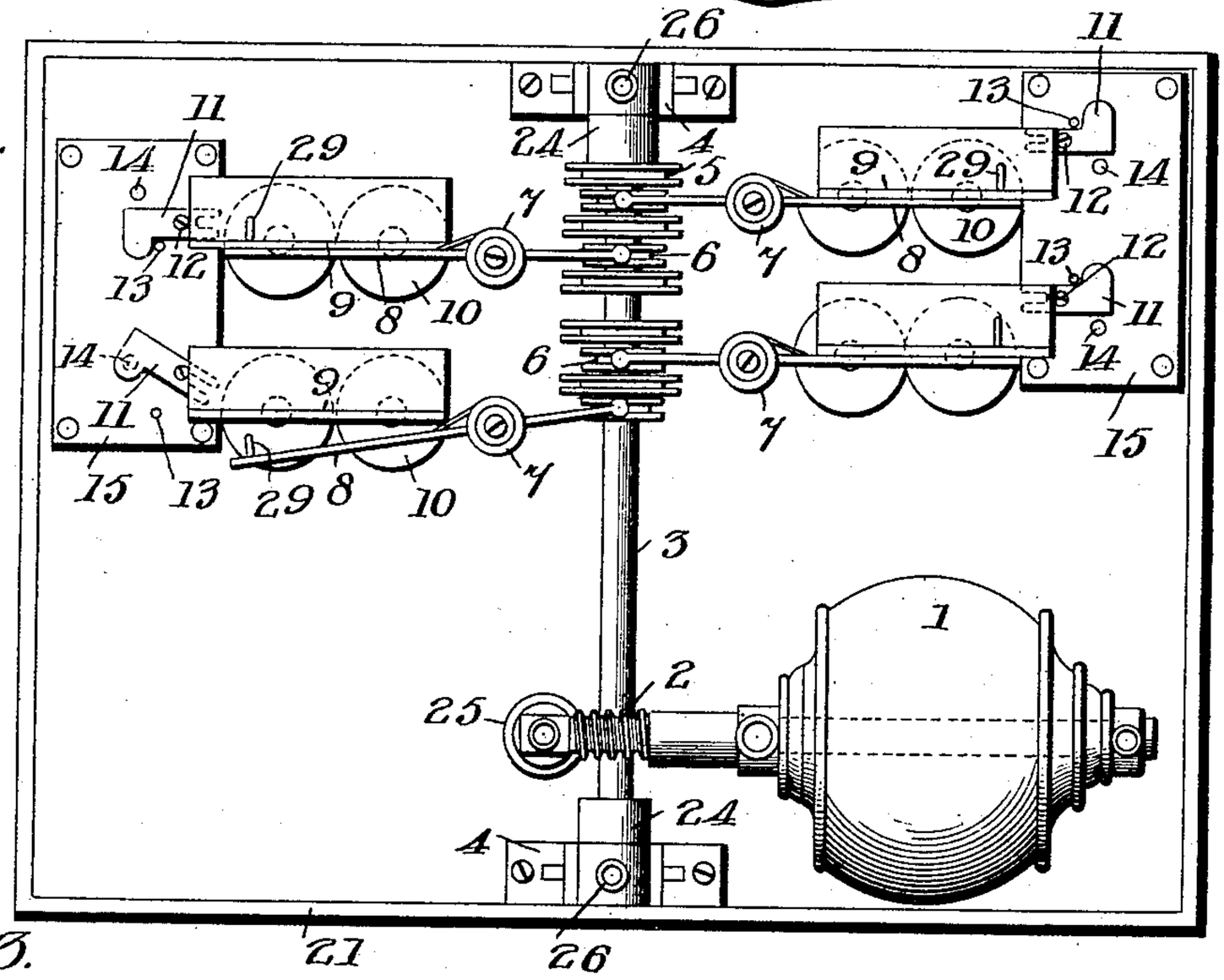

Fig. 3.

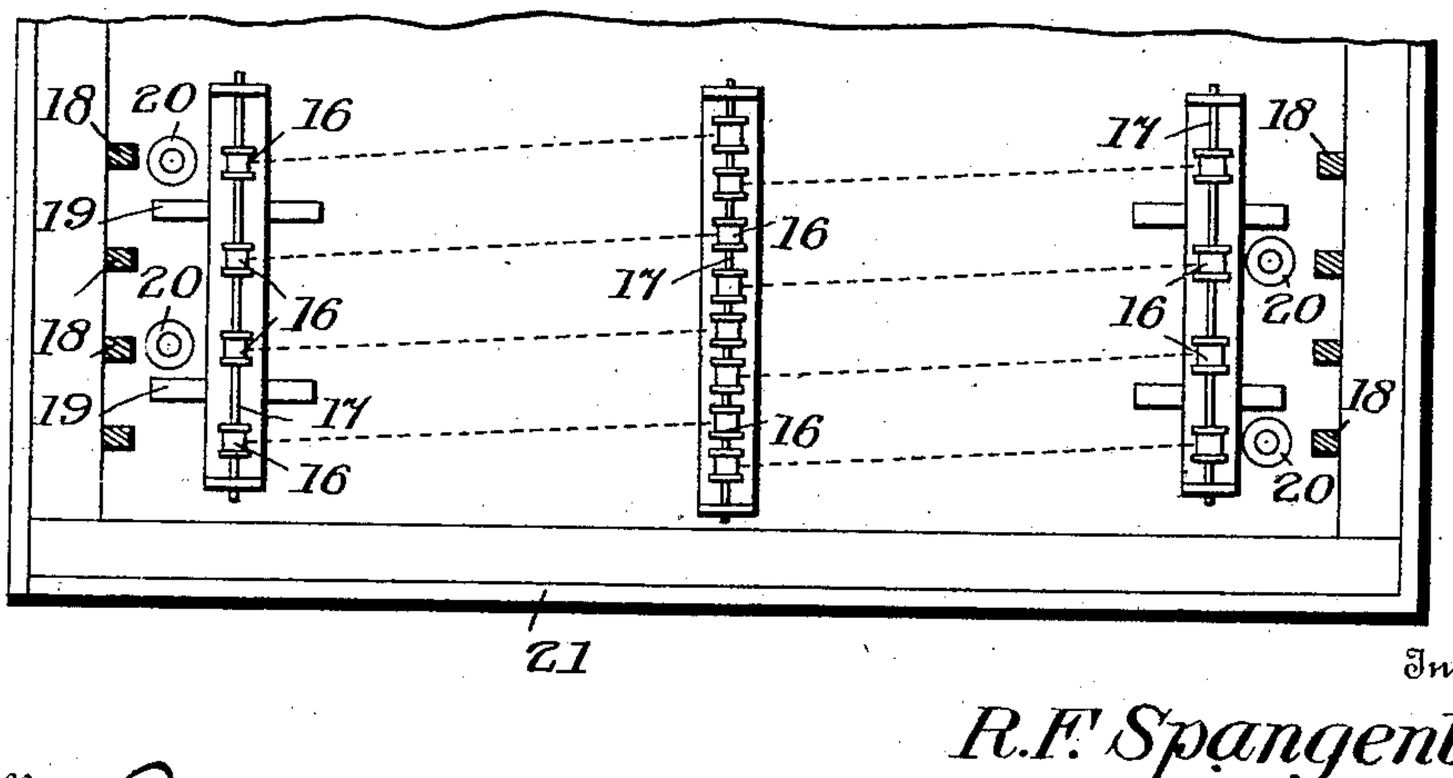

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Fig. 4.

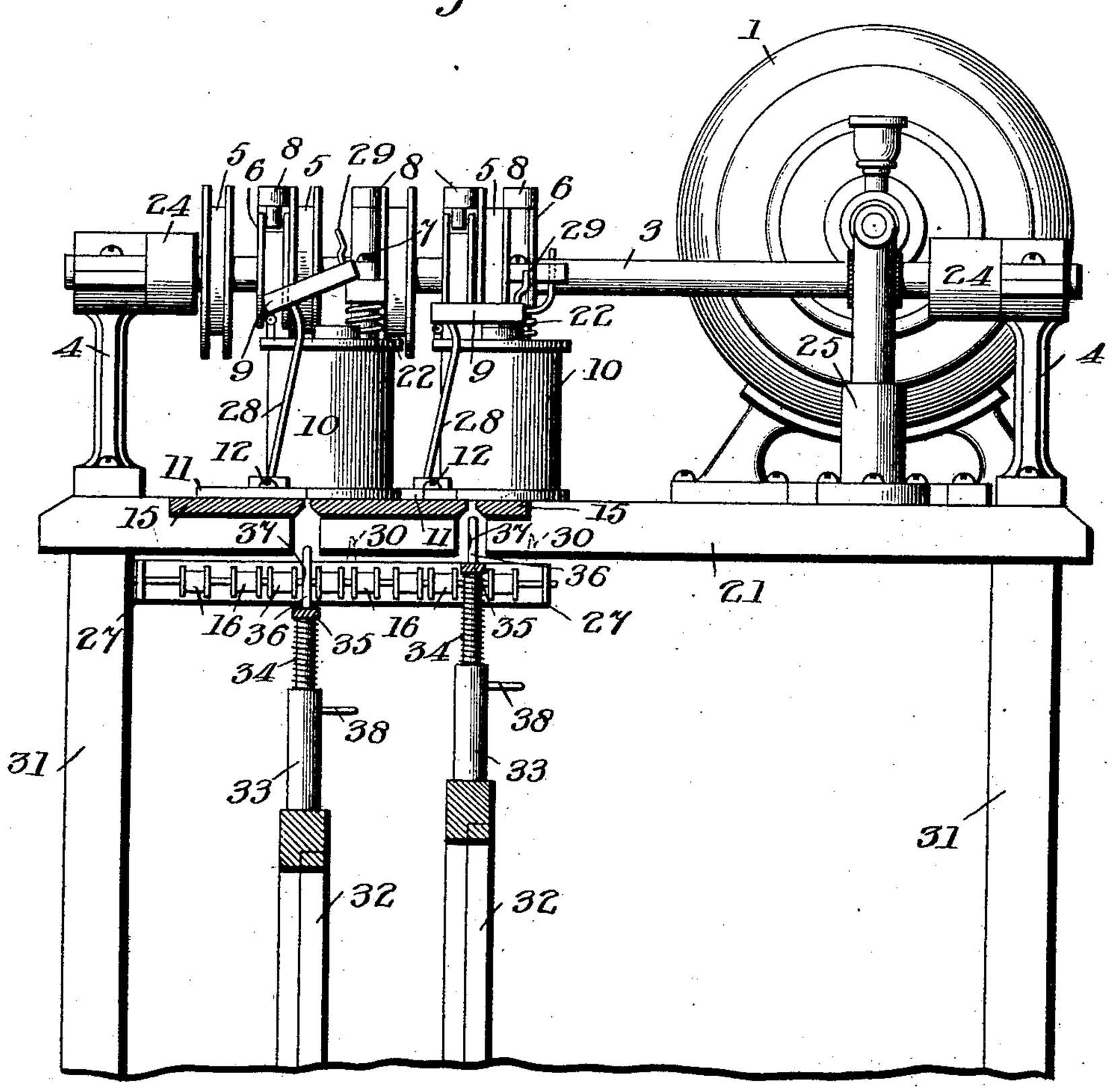

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Fig. 5.

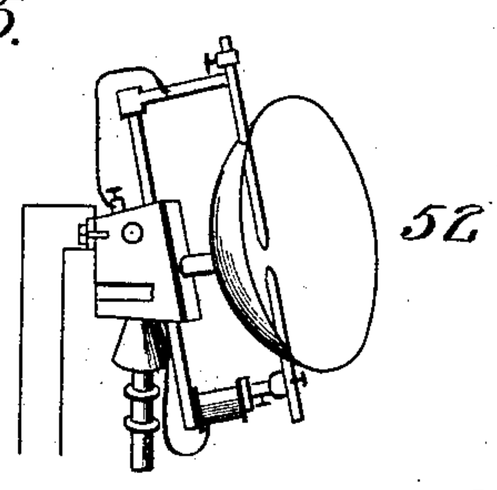


Fig. 6.

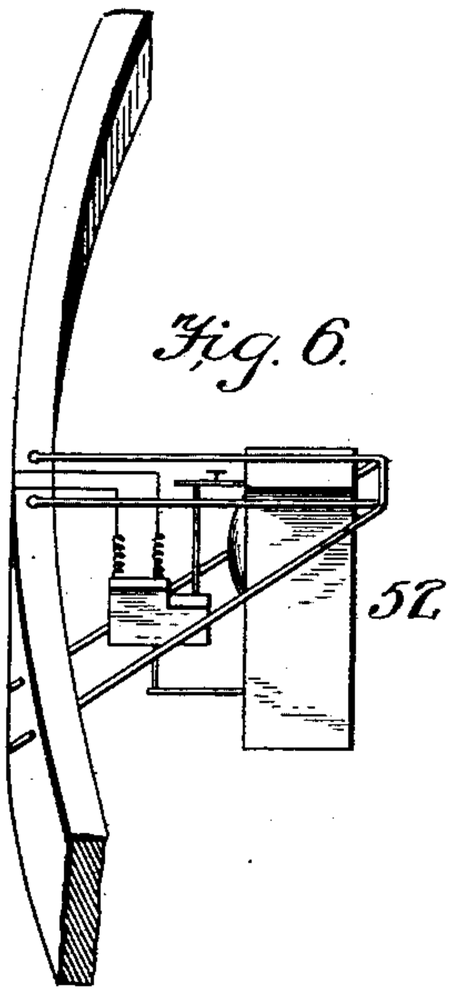


Fig. 8.

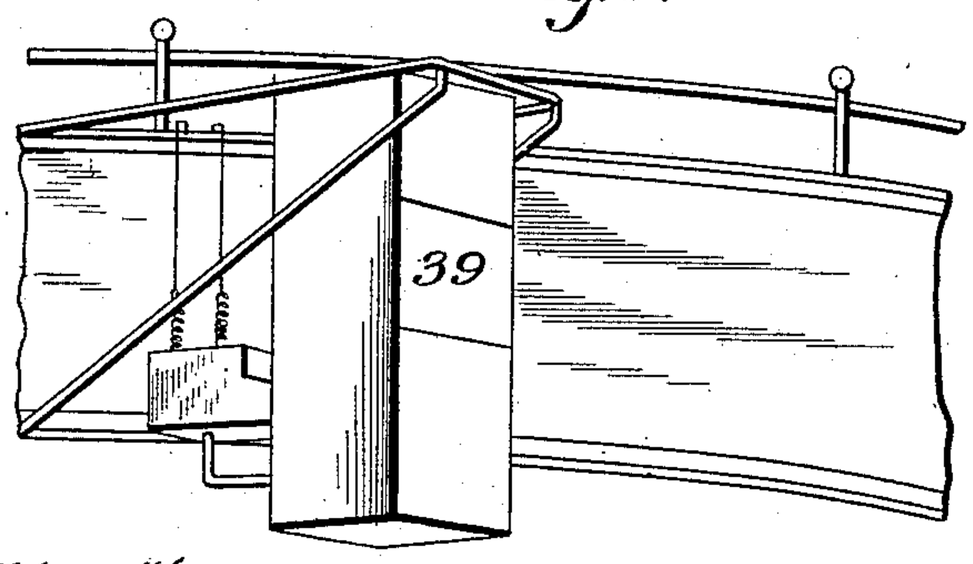
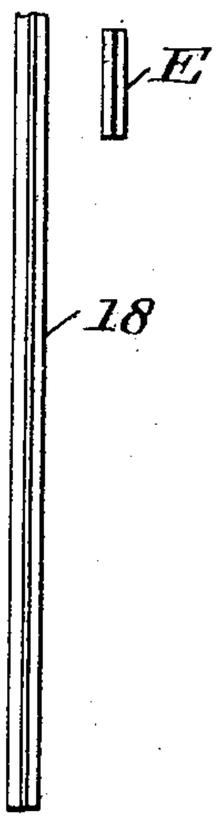


Fig. 7.



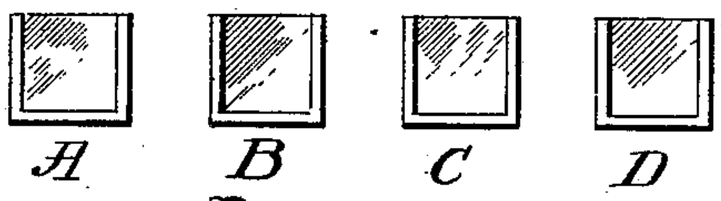


Fig. 9.

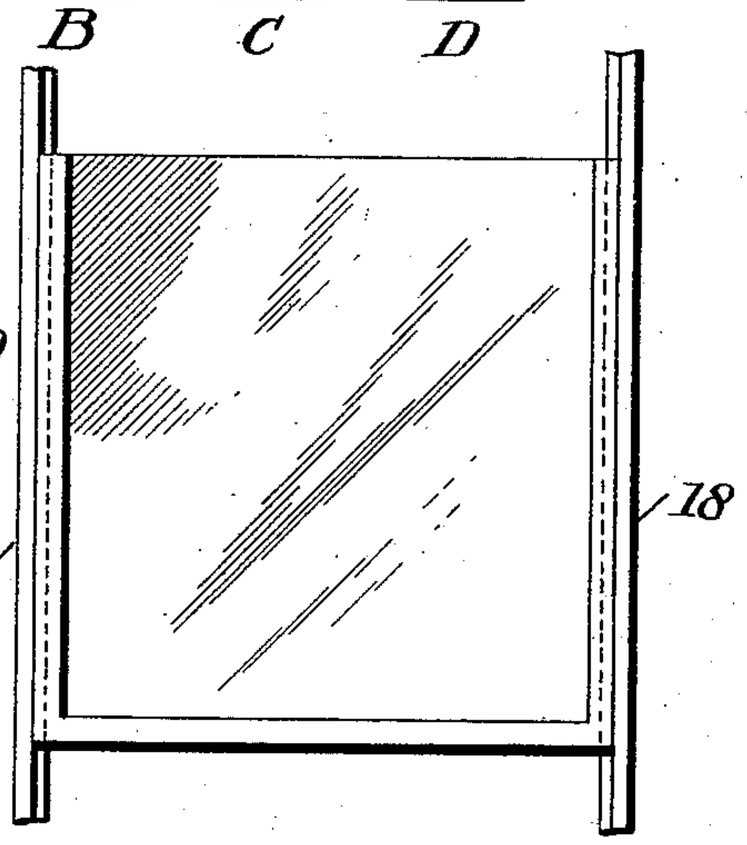


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Fig. 10.

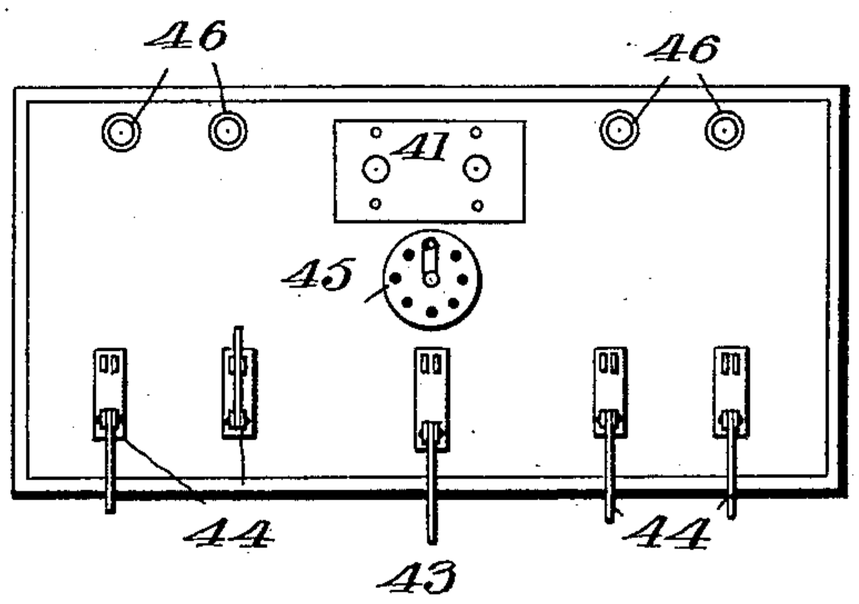
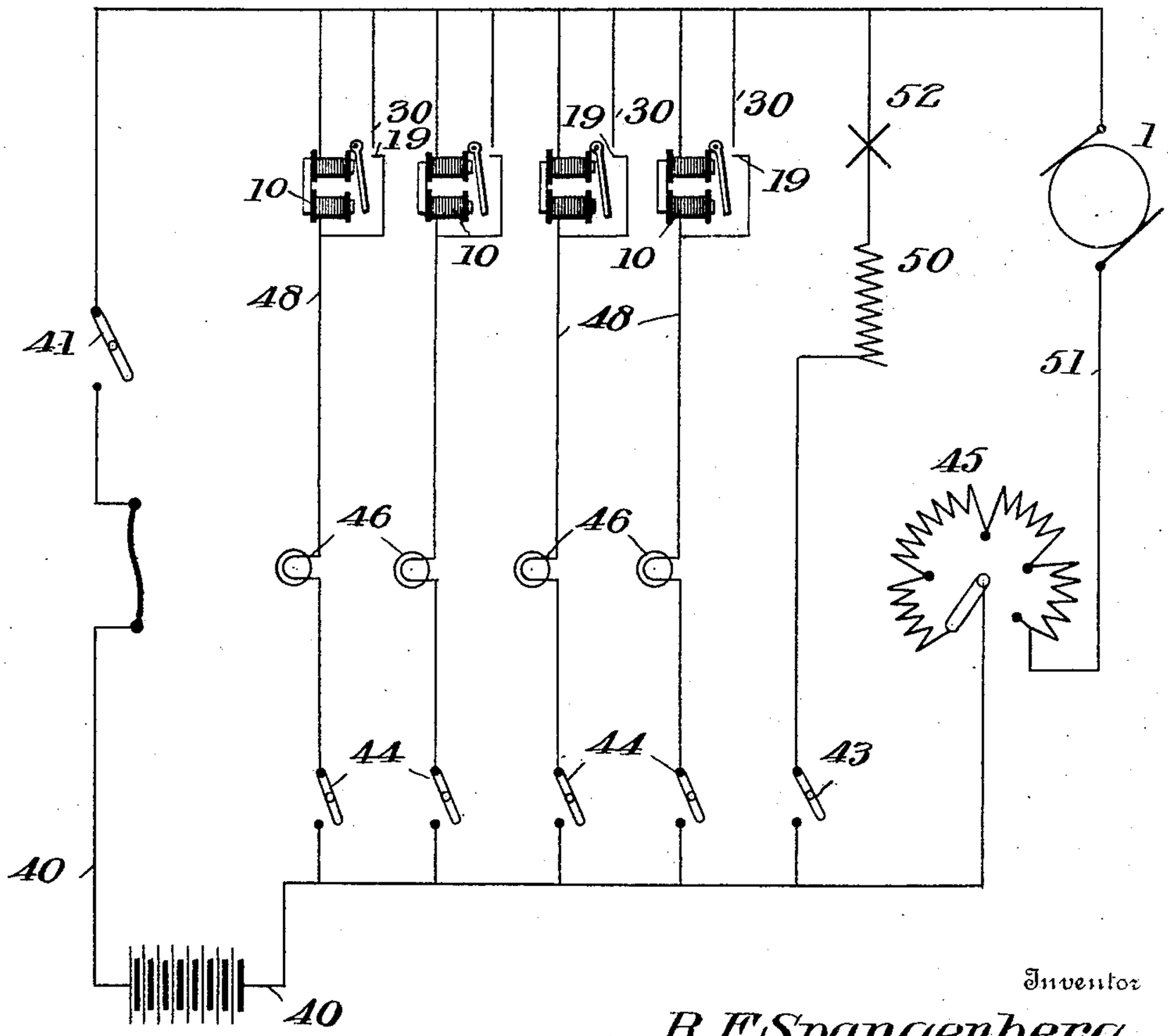


Fig. 11.



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UNITED STATES PATENT OFFICE.

ROBERT F. SPANGENBERG, OF NEW ORLEANS, LOUISIANA.

SYSTEM OF AND APPARATUS FOR CONTROLLING LIGHT EFFECTS.

SPECIFICATION forming part of Letters Patent No. 715,702, dated December 9, 1902.

Application filed November 18, 1901. Serial No. 82,809. (No model.)

To all whom it may concern:

Be it known that I, ROBERT FERRIDAY SPANGENBERG, a citizen of the United States of America, residing at New Orleans, in the parish of Orleans and State of Louisiana, have invented certain new and useful Improvements in Systems of and Apparatus for Controlling Light Effects, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to an improvement in systems of and apparatus for electrically displaying and changing colored lights upon a theatrical stage or upon a moving body.

The objects of my invention are to provide a method for transmitting electric rays of light through various-colored plastic, textile, or transparent material in an automatic manner and causing said rays of various-colored lights to be thrown upon a stage or moving body and to be changed instantaneously or at will, as may be desired. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal section. Fig. 2 shows plan view of the top of my apparatus. Fig. 3 is a reverse view or under part of Fig. 2. Fig. 4 is a transverse section of Fig. 2. Fig. 5 is a side view of theatrical projecting automatic self-focusing electrical-arc lamp. Fig. 6 is a side view of apparatus as supported from balcony of theater. Fig. 7 is a front view of color-frames and edge view of rails. Fig. 8 is a front view of apparatus in position. Fig. 9 is a front view of color sliding frame and rail-groove. Fig. 10 is a front view of switchboard. Fig. 11 is a view of electrical connections from the switchboard to apparatus.

Similar letters and numerals refer to similar parts throughout the several views.

In constructing my apparatus I provide a cabinet of the construction shown in Fig. 8. Placed upon its top plane is an electric motor 1, which furnishes the power for imparting motion to my apparatus.

2 is a worm-screw on armature-shaft of motor and which rests on a worm-wheel (not shown) upon shaft 3. This construction obviates the necessity of a belt and overcomes friction to a great extent.

4 designates shaft-bearings.

5 designates pulleys upon shaft 3, the face of pulleys being smooth, with flanges on each side, being thus constructed so that clutches 6 can readily engage same when it is desired to shift the clutches.

7 designates clutch-lever pivots.

8 shows arms or levers of clutches.

9 is the magnet-armature.

10 designates magnets.

11 designates a latch for pin of color-slides.

12 is a pivot for latch.

13 is a rest or stop for latch-pin.

14 designates openings in bed-plate for color-slide pin.

15 is a metal bed-plate.

16 designates grooved pulleys or idlers placed upon shaft 17 and upon which cords are placed which raise and lower slides.

18 shows position of rails upon which color-slides travel, as seen in Fig. 3, and an edge view of rail is also shown in Fig. 7, and in same figure the letters A, B, C, and D show front view of slides, each letter indicating a slide of a different color, and E showing an edge view of slide-frame.

The faces of my slides are made, preferably, of various-colored sheets of gelatin or isinglass; but they may be constructed of any transparent material, such as colored glass or silk.

19 designates springs for short-circuiting.

20 designates openings for color-slide pins in Fig. 3 and form the under portion of openings 14 in Fig. 2.

21 is the top frame of my apparatus.

22 shows a spring for clutch-lever 8.

23 is a pillar for supporting arm or lever 8.

24 shows collars on shaft 3.

Placed at 25 is a worm-screw bearing.

26 shows oil-openings.

27 shows bearings of idler-shaft.

28 in Fig. 4 shows rod which operates latch 11.

29 designates rods for operating clutch-lever.

30 shows a contact for spring 19 to short-circuit magnets.

31 shows front and rear of the cabinet for color-slides.

32 shows the position of color-slide with the hollow base of latching-pin 33, with springs of latching-pin, as shown by 34, also head 35

on latching-pin to regulate extension of pin through opening 14 in metal bed-plate 15. The color-slide latching-pin 36 is provided with a notch 37, into which latch 11 is thrown automatically.

38 is an arm which depresses short-circuiting spring 19.

39 is an opening in my apparatus for transmitting light.

40 shows lead-wires from electric-light mains.

41 is a fusible switch.

42 is one leg of electric circuit from fusible switch to switchboard.

43 is a switch-controlling arc-lamp circuit; 44, switches controlling magnet-circuits to operate color-slides.

45 is a rheostat placed upon switchboard to control motor.

46 shows stained incandescent lamps to correspond with similar color in apparatus and as a means of resistance in magnet-circuits and to indicate whether the same is working.

47 is one leg of electric circuit from fuse-block to apparatus supplying magnets, motor, and arc-light.

48 is a wire which completes circuit from switch to magnets and has lamps 46 in circuit.

49 shows wire that completes circuit from switch to arc-light.

50 shows resistance-coil in arc-lamp circuit.

51 is a wire which completes circuit from switchboard to motor with 45 in circuit.

52 designates an arc-lamp.

It will thus be seen by the foregoing construction that the color-slides are so placed in the cabinet that each slide can be raised as they are desired by means of electricity, and lowered by their own gravity.

The electric motor 1 drives the shaft 3 by means of a worm-gearing 2, the bearings 4 supporting shaft 3, on which shaft are placed pulleys 5, upon which a cord winds to raise color-slides and are in a fixed position on shaft. The clutches 6 are upon shaft and are movable, and when lever of clutch is thrown engages 5 causing same to rotate.

8 designates arms or levers of clutches, which are pivoted, as shown by 7, and operate 6 when electric current is turned on to energize magnets 10, which magnets attract armature 9, causing the rods 29 to actuate the arms or levers 8 in the manner desired. Rods 28, moving forward, enable latch 11 to be thrown over openings 14 in bed-plate and prevent latching-pin 36 passing through opening 14, thus causing springs 34 to be depressed when arm 38 operates spring 19, causing said spring to short-circuit magnets 10 by forming contact with contact-point 30, thereby forcing magnets 10 to release armature 9, when clutch-lever spring 22 moves the parts 6, 8, 9, and 11 from their engaged position and the opening 14 is clear. The latching-pin 36 is then pushed up through opening 14 by means of springs 34. Pin 36 is prevented from projecting beyond a given distance by its head 35, which also serves to hold spring 34 in position, the clutches 6 being disengaged by the aforesaid action from the pulleys 5. There is nothing to hold color-slide 32 in its position. Hence it tends to drop back into its normal place by gravity; but in so doing it brings 33 with it and upon which is fastened arm 38, and said arms release springs 19, thus releasing short-circuit from magnets 10 and permitting the electric current to again energize the magnets 10, which in turn attracts armature 9; but as the pin 36 is in the opening 14 the armature 9 is permitted to go only a given distance by means of the latch 11, which enters notch 37 of the latching-pin 36, thus holding up the color-slide 32 in active position, and as the armature 9 cannot go all the way down it does not again cause the clutches 6 to engage pulleys 5, thus leaving 5 free.

It will be seen in operating apparatus that to elevate a color after main switch 41 has been turned on and motor started by means of rheostat 45 close one of the color-slide switches 44, causing electricity to flow through circuit 48, thence through lamp 46, causing same to light, indicating by its brightness whether circuit is working, also serving as a means of resistance to magnets 10 to prevent too much current flowing through same, thence through magnets 10, energizing them and causing apparatus to work as described. By closing switch 43 and causing electricity to flow through circuit 49 and through rheostat 50 to arc-lamp 52 which are automatic lights, these lights getting a color effect through color mediums A, B, C, and D.

I am aware that it has been proposed to use a disk or color wheel for "light effects" upon a stage; but I disclaim any such invention, as by this construction only one color can be displayed and only a color placed in rotation on a disk or wheel, thus preventing any desired blending or succession of colors, making it impossible to produce a perfect representation of a "sunrise," "sunset," or the approach or abatement of a "storm" upon a theatrical stage. I accomplish these "effects" by using a color-slide box with top of color-frame so thin that it throws no shadows when blending or changing colors. The color-slide box is open at the bottom, so as to enable the color-frame to be changed should this be required, of which I usually use one dozen to produce desired color effects—viz., two shades each of amber-red, blue, green, one greenish-blue, one rose-purple, and one pink, and one hood to screen light suddenly when dark changes of scene are made on theatrical stage in front of audience without dropping curtain.

The color-frames are provided with cords, which pass over idlers and pulleys. The source of light and color-slide box will be placed outside the balcony-rail in the auditorium, thus economizing space and avoid an-

noyance of operator going to and fro during and between the acts of the play.

An advantage of my invention is its economical construction and ease by which the same may be operated, saving both time and labor and producing light effects electrically and correctly.

Having described my invention and the manner in which the same is or may be carried into operation, would say that I do not limit myself to the precise details shown in illustration, as the same may be varied to some extent; but

What I claim, and desire to secure by Letters Patent, is—

1. In an apparatus of the character described, the combination of an inclosing casing, an electric light mounted therein, a plurality of color-frames slidingly mounted in said casing, cords attached to said frames, a rotating shaft, winding-drums carrying the ends of said cords mounted on said shaft, and electromagnetically-operated mechanism adapted to throw said drums into action to raise the respective frame.

2. In an apparatus of the character described, the combination of an inclosing casing, an electric light mounted therein, a plurality of color-frames slidingly mounted in said case, cords attached to said frames, a rotating shaft, winding-drums carrying the ends of said cords mounted on said shaft, electromagnetically-operated mechanism adapted to throw said drums into action with said shaft to raise their respective color-frames, and mechanism electrically connected to said electromagnetically-operated mechanism whereby the latter may be controlled from a distance.

3. In an apparatus of the character described, the combination of an inclosing casing, an electric light mounted therein, a plurality of color-slides slidingly mounted in said case, a power-shaft mounted upon said casing, winding-drums loosely mounted upon said shaft, cords connected to said frames adapted to be wound upon said drums, clutches interposed between said shaft and drums, and electromagnetically-operated mechanism for throwing said clutches into action.

4. In an apparatus of the character described, the combination of an inclosing case, an electric light mounted therein, a plurality of color-slides slidingly mounted in said case, a power-shaft mounted upon said case, winding-drums loosely mounted upon said shaft, cords connected to said frames adapted to be wound upon said drums, clutches interposed between said shaft and drums, electromagnetically-operated mechanism for throwing said clutches into action, and a switchboard located at a distance and electrically connected to said magnetically-operated mechanism through which the same may be controlled from a distant point.

5. In an apparatus of the character described, the combination of an inclosing casing, an electric light mounted therein, a plurality of color-frames slidingly mounted in said frame, a rotatable shaft, an electric motor adapted to drive said shaft, a plurality of winding-drums loosely mounted on said shaft, cords attached to said frames and adapted to be wound upon said drum, clutches interposed between said drums and shaft, electromagnetically-operated mechanism adapted to throw said drum into action to raise said color-frames, a switchboard located at a distant point and electrical connections between said switchboard and said light, the motor and said electromagnetically-operated mechanism, whereby the same may be controlled as desired from a distant point.

6. In an apparatus of the character described, the combination with a cabinet carrying a light, color-frames mounted therein, and electromagnetically-operated mechanism adapted to bring said color-frames into position as desired; of a switchboard, switches carried thereby and electrically connected to said electromagnetically-operated mechanism, and colored lights in proximity of each of said switches, each of said lights corresponding to the colored frame adapted to be thrown into position when the circuit is closed through the corresponding switch.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT F. SPANGENBERG.

Witnesses:
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J. B. ROSSER, Jr.