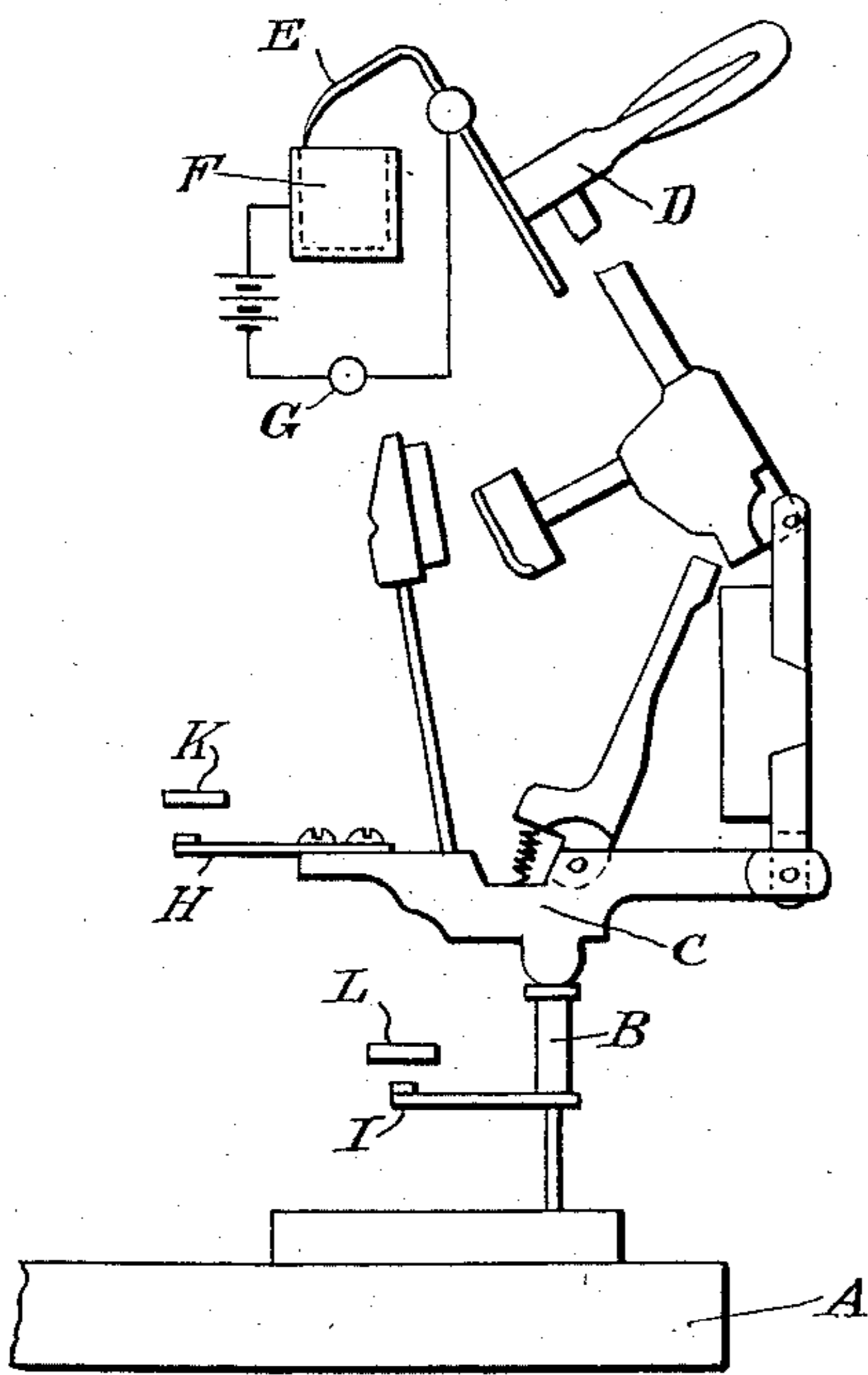


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 APPARATUS FOR PRODUCING COLOR MUSIC.  
 APPLICATION FILED JULY 9, 1917.

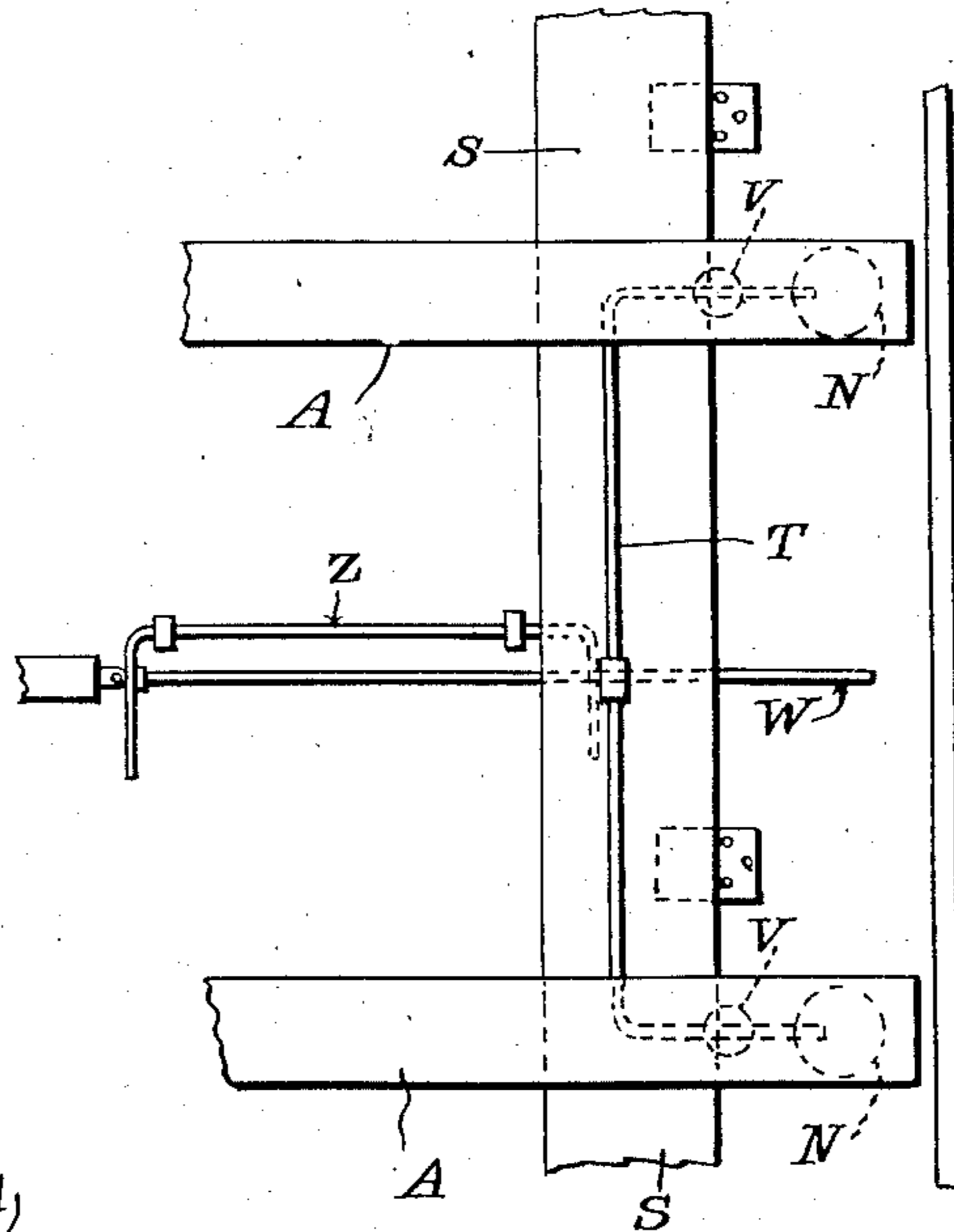
1,388,706.

Patented Aug. 23, 1921.  
 2 SHEETS—SHEET 1.

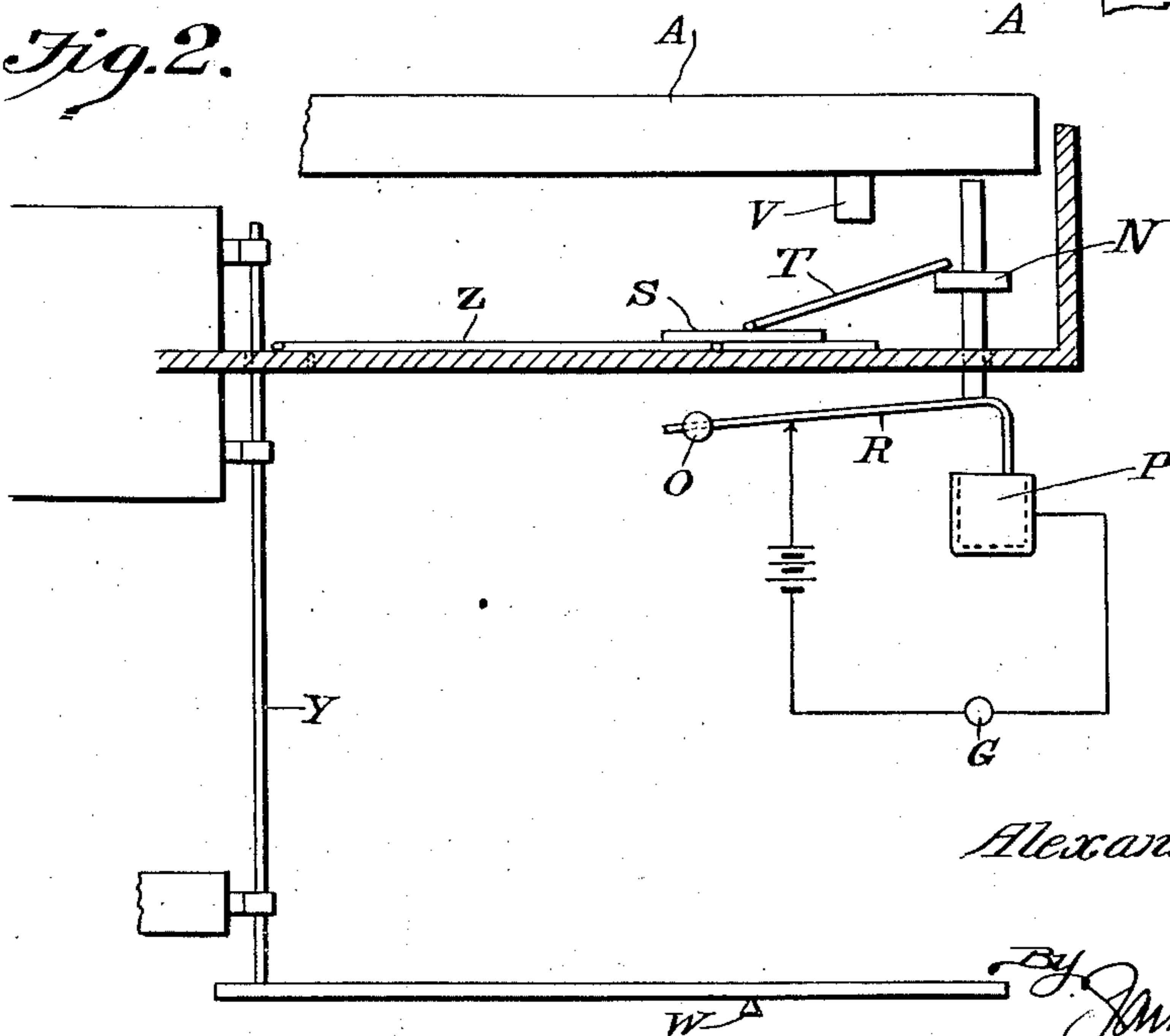
*Fig. 1.*



*Fig. 3.*



*Fig. 2.*



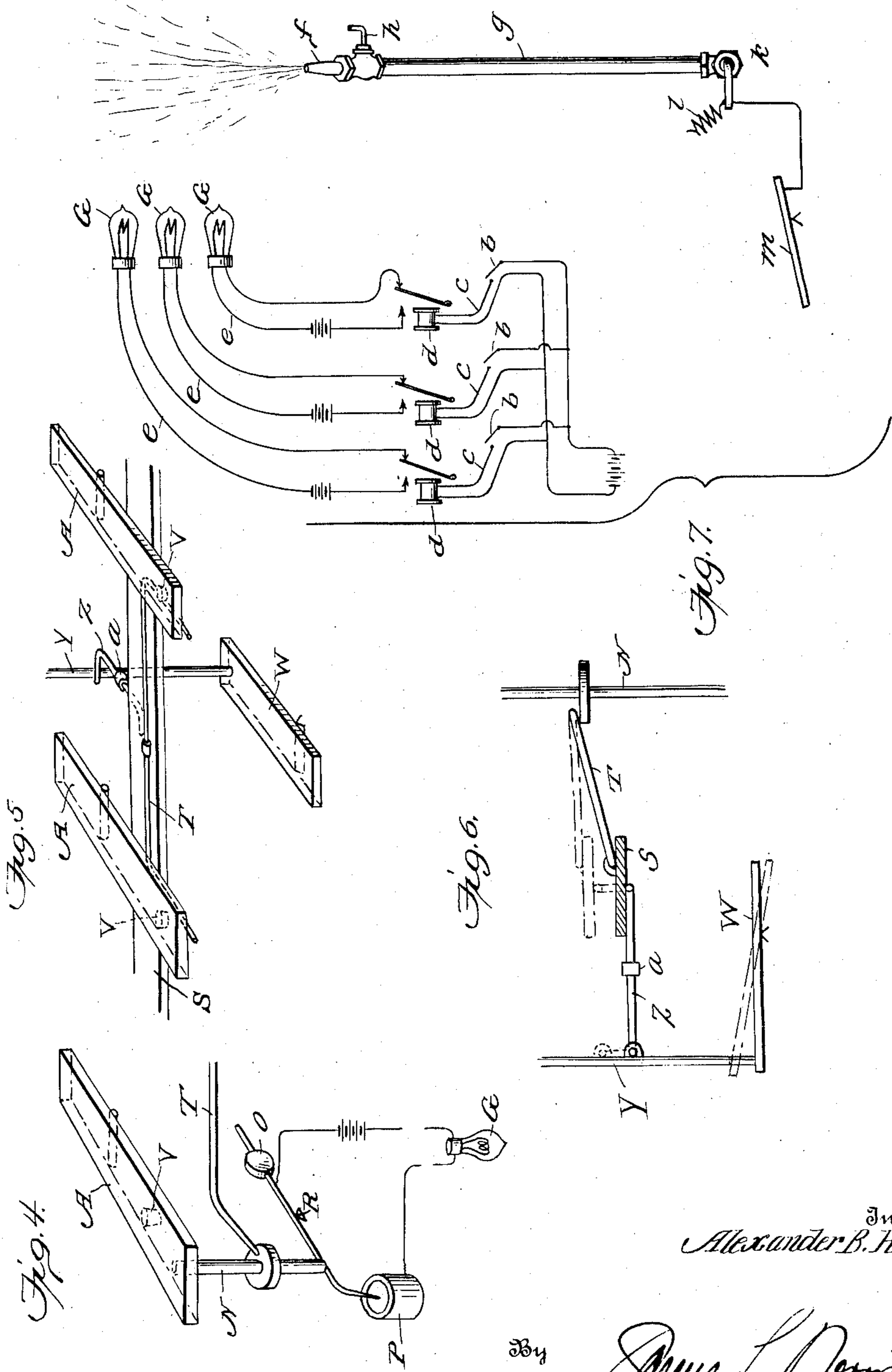
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 Attorney



# UNITED STATES PATENT OFFICE.

ALEXANDER BURNETT HECTOR, OF GREENWICH, NEAR SYDNEY, NEW SOUTH WALES, AUSTRALIA.

## APPARATUS FOR PRODUCING COLOR-MUSIC.

1,388,706.

Specification of Letters Patent. Patented Aug. 23, 1921.

Application filed July 9, 1917. Serial No. 179,460.

To all whom it may concern:

Be it known that I, ALEXANDER BURNETT HECTOR, a subject of the King of Great Britain, residing at Greenwich, near Sydney, in the State of New South Wales, Commonwealth of Australia, have invented certain new and useful Improvements in and Relating to Apparatus for Producing Color-Music, of which the following is a specification.

This invention has reference to improvements in and relating to the production of color music and other spectacular effects and apparatus therefor as described in my prior British Patent No. 29615 of 1912, also my recent prior applications for Letters Patent of the United States of America, filed June 8, 1917, Serial Nos. 173,671 and 173,672, in which the movements of the keys of a piano, piano player, and organ are made to operate a series of switches so as to light a series of lamps in connection with the production of color music.

When the key of a piano, or combined piano and player, is depressed, the hammer moves forward and strikes a given set of wires producing an individual note of music; this movement of the hammer is utilized to complete the electric circuit of a given switch and light a given lamp or series of lamps. By repeating this for every hammer of the piano and suitably coloring the various lamps color music is made possible as already described in my said prior applications for Letters Patent.

The present invention has for its general objects to provide improved circuit-closing means for apparatus of this character, to provide means for producing sustained and octave effects, and to provide for the sympathetic control of water, steam, smoke, or other fluid on which to project and reflect the colors.

The foregoing and other objects of the invention, together with means whereby the same may be carried into effect, will best be understood from the following description of one form or embodiment thereof illustrated in the accompanying drawings, in which:

Figure 1 represents in elevation the vari-

ous parts of a piano movement at the rear of the keys and to which the contact devices of this invention have been attached.

Fig. 2 is a sectional elevation showing the invention fitted to the forward end of one key.

Fig. 3 is a plan showing the coupling bar between two keys, one octave apart.

Fig. 4 is a detail perspective view, partly diagrammatic, of the circuit closing means shown in Fig. 2.

Fig. 5 is a detail perspective view and Fig. 6 a fragmentary sectional view of the octave coupling means shown in Figs. 2 and 3.

Fig. 7 is a fragmentary detail view, partly diagrammatic, of the fluid projecting means and the lamp controlling relays.

In Fig. 1, A is a piano key which is pivoted in the usual manner and on being depressed causes the extension B to lift. This extension in turn raises the wippen C which throws forward the hammer D which by striking a tuned string produces a note of music. As the hammer D moves forward to strike the string the end of the contact lever E which is suitably weighted or controlled by a spring drops into the mercury cup F and thus completes an electric circuit through the lamp G. At the same time and by the same movement of the key A two other independent circuits may be closed by the contact arms H and I, which are carried by the wippen C and extension B, respectively, and make contact on the metal strips K and L. When pressure is removed from the key A the hammer D drops and strikes the lever E causing it to break the electric circuit through the lamp. At the same time the wippen C and extension B drop back to their normal position thus breaking the circuits through I and H.

From the foregoing it will be seen that advantage has been taken of the hammer movement to control a plurality of circuits by the operation of a single key, and that the arrangement is especially suitable for use in connection with combined piano players wherein the space within the case is very largely occupied by the player mechanism. It will also be observed that the construction and arrangement of the lever E is such that



it follows the hammer D through the full extent of the movement of the latter, thus insuring electrical contact during the whole period of the depression of the controlling key.

When a note, or chord, of a piano is struck, and the sustaining pedal is depressed at the same time, wires of the octaves of these notes are set vibrating by the well known principle of resonance. To obtain a somewhat similar effect in color, the following mechanism is provided:

In Figs. 2 to 6, each, key A on being depressed acts on the plunger N, which in turn tilts the weighted lever O into the mercury cup P thus completing an electric circuit through the lamp. When pressure on the key A is removed the weighted lever O which is pivoted at R falls back to its original position thus breaking the electric circuit through the lamp. In addition along the underside of the whole length of the keyboard is a hinged coupler board S on which are fixed a series of coupling levers or rack shafts T only one of which is shown in the diagrams. The bent end of each lever rests on the flange of the corresponding plunger N and when the coupler board is in the position shown in Fig. 2, these bent arms are out of reach of the buttons V carried by the several keys A when said keys are depressed. When the octave or sustaining pedal W is operated it causes the rod Y to lift. This rod is fitted with a projecting piece on which rests one arm of the rock shaft or bent lever Z pivoted at *a* and the other arm of which is under the coupler board S. The action of the pedal in lifting the rod Y causes the coupler board to be raised, as shown in dotted lines in Fig. 6, and brings the bent arms of the lever T into a more or less horizontal position so that when the key A is next depressed the button V pressing on one arm of the lever T causes the opposite end to depress the plunger one octave higher and complete an electric circuit through a second lamp.

The complete sequence of movements is, first, the depression of the sustaining pedal W which acts through the rod Y and lever Z to raise the coupler board S, second, the depression of the given key A and the simultaneous depression of the corresponding plunger N which acts to close the corresponding switch P—R, and, third, actuation by the button V on the depressed key of the corresponding lever T the other end of which acts on the plunger N under the key an octave higher on the scale. Consequently, when the sustaining pedal is depressed, each key is made to control two lamps or two series of lamps, and, by the multiplication of the arms of the individual levers T, three or more octaves may be operated at the same time by the depression of a single key.

The circuit closing devices E—F, H—K, I—L, and P—R, above described, may, if desired, control the circuits to the lamp G directly, as shown in Figs. 1 and 2. Preferably, however, and as shown in Fig. 7, these circuit closing devices (three of which are generically indicated by the letter *b* in the latter figure) are arranged to control circuits *c* to magnetic relays *d* which, in turn, control circuits *e* to the several lamps G. The relays *d* are preferably of a well known type involving a time element, whereby a sustained effect in the display of the colors is produced.

In order to obtain a varying body or form on which to project and reflect the light, fountains of water, steam, or smoke may be employed. Thus, as shown in Fig. 7, the light from the lamps G is projected upon a spray or jet from a nozzle *f* supplied with fluid from any suitable source through a pipe *g*. Flow from the nozzle *f* may be controlled by a hand operated valve *h*, but is preferably regulated by a valve *k* controlled by a spring *l* and operated, through suitable connections, by one or more pedals *m* which may be the loud or soft pedals of the instrument, or both, whereby the volume of the spray or cloud will be in sympathy with the pianissimo, piano, mezzoforte, forte, and fortissimo of the music.

The apparatus hereinbefore described is preferably utilized in conjunction with the definite tempered color scales described in my said prior applications for Letters Patent.

Having thus described my invention what I claim as new and desire to protect by Letters Patent, is:—

1. In an apparatus of the character described, the combination with a keyed musical instrument, of means for displaying a variety of colors corresponding to the several notes struck, circuit closing devices operated by the several keys for controlling said displaying means, each of said circuit closing devices comprising a mercury cup and a lever having a portion adapted to dip into said cup, and a coupler mechanism cooperating with said controlling devices for causing a plurality of said colors to be simultaneously displayed upon operation of a single key.

2. In an apparatus of the character described, the combination with a musical instrument and means controlled thereby for producing varied color effects in accordance with the notes sounded by said instrument, of means under the control of the player and including one or more electric contacts and one or more electro-magnetic relays having a time element for varying the operation of said color producing means to produce a sustained effect therein.

3. In an apparatus of the character de-



scribed, the combination with a musical instrument and illuminating means controlled thereby for projecting a variety of colors in accordance with the notes sounded by said instrument, of means controlled by said instrument for discharging a body of fluid upon which said colors are projected.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ALEXANDER BURNETT HECTOR.

Witnesses:

CHARLES E. ENHAM,  
HENRY W. CLARKE.