SINGERMAN COLOR MIXER USER'S MANUAL

Lafayette Instrument®
3700 Sagamore Parkway North
P.O. Box 5729 • Lafayette, IN 47903 USA
Tel: 765.423.1505 • 800.428.7545
Fax: 765.423.4111
E-mail: info@lafayetteinstrument.com
www.lafayetteinstrument.com

Table of Contents:

3700 Sagamore Parkway North · PO Box 5729 · Lafayette, IN 47903 USA · Ph: 765-423-1505

System Description:

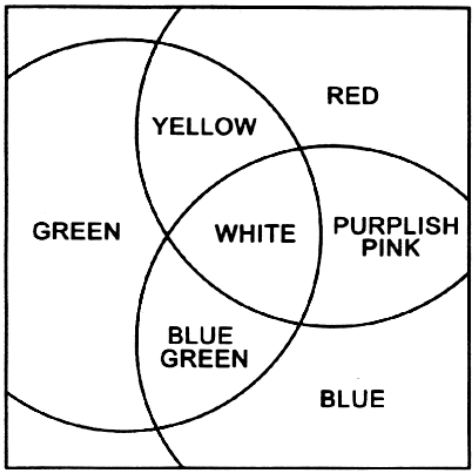
The Singerman Color Apparatus consists of a light-tight box, or case, provided with a large milk-glass screen. Just back of this screen is a partition with a six-inch circular opening in the center. Back of this partition is another with three 2-inch circular openings behind which are mounted three incandescent lamps. Rheostats individually control the brilliancy of these lamps. These lamps are accessible at the back of the case through a cover, which runs up and down in a slotted groove and is held permanently in place by screws.

Procedure:

1. An important adjustment of these lamps should be checked. Each lamp should be at such a position behind its 2-inch hole that the filament of the lamp, when viewed with your eye at the center of the six-inch aperture will appear in the center of the 2-inch hole. Rotate the filter wheels to the yellow filter. This then will show a yellow disk of light the screen of equal intensity over its entire area. This adjustment is made at the factory but, in shipping, the lamps can get 'bumped' out of place. Have all rheostats turned to "bright" while making this adjustment. Now adjust the filter wheels to place a red, a green and a blue filter in front of the three bulbs. Three disks (red, green, and blue) will overlap on the milk glass, as shown Figure 1.

2. To insure the best results, all demonstrations with the color apparatus should be made in a partially darkened lecture room. Set the apparatus on the front edge of the table to get the screen as near the students as possible, with the demonstrator standing on the front side of the table where he can himself see the color effects he is demonstrating.

3. With the cord plugged into the case and into the AC 115-volt line, the three lamps are under the control of the operator.



TRUE PRIMARIES
Figure 1

EXPERIMENT NO. 1

Adjust all filter wheels to the yellow filter and turn on one lamp to full brilliancy. A single yellow disk will appear uniformly illuminated on the glass screen. If one side of the disk is shaded then the lamp should be adjusted, as already explained. Repeat for the second and third lamps. The demonstration shows the uniformity of illumination and the symmetrical overlapping of the three disks.

EXPERIMENT NO. 2: THREE PRIMARY COLORS OF MAXWELL

Facing the milk-glass screen, rotate filter wheel No. 2 to the red filter. Rotate the rheostat to "bright" and depress to turn on. A bright red disk will appear on the screen. In like manner rotate filter wheel No. 3 to the green filter and rotate filter wheel No. 1 to the blue filter. Turn on their respective lights. The overlapping red, green and blue disks should appear on the screen as shown in Figure 1. As same variations in filters and in their density are unavoidable, some adjustment of the rheostats will be necessary (in this case, probably the red) to make the three disks harmonize in intensity so as to bring the center spot, where the three colors mix, to a satisfactory white. The tints of the mixtures of two colors are also indicated in Figure 1, and should be checked with your results on the screen. Thus the production of white light by a simultaneous addition of the three primary colors is effectively shown.

EXPERIMENT NO. 3: STUDY OF TWO MIXING PRIMARY COLORS

Shut off the lamp behind the red filter, leaving only the blue-green filters in operation. As the green filter is denser, the overlapping color resulting from this combination is strongly blue but by toning down the blue by means of the rheostat, the greenish tinge is increasingly apparent.

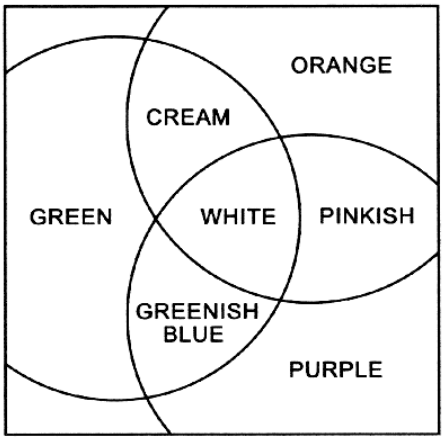
Using the red and blue lights and regulating them with the rheostats the purplish-pink when the blue predominates and the more pinkish when the red predominates can easily be shown.

Using red and green disks gives a yellowish tinge when the green predominates, orange if the red is stronger.

These experiments show that in mixing colored lights by addition, the color that predominates gives its characteristics to the mixture.

EXPERIMENT NO. 4: FALSE PRIMARIES

Rotate filter wheel No. 3 to the green filter, rotate filter wheel No. 2 to the orange filter, and rotate filter wheel No. 1 to the purple filter as shown in Figure 2. Switch on all lamps, adjust the purple to "bright". Adjust the other rheostats, particularly the orange, until the center section shows approximately white. The fact that a sensation such as white results from mixing lights which do not even approximate lights of spectral, or pure, color is due to the nature of the human eye, which is a synthetic rather than an analytic organ. If the display of colors is studied in connection with Figure 2, the colors mentioned in the figure will be found faithfully reproduced.



FALSE PRIMARIES
Figure 2

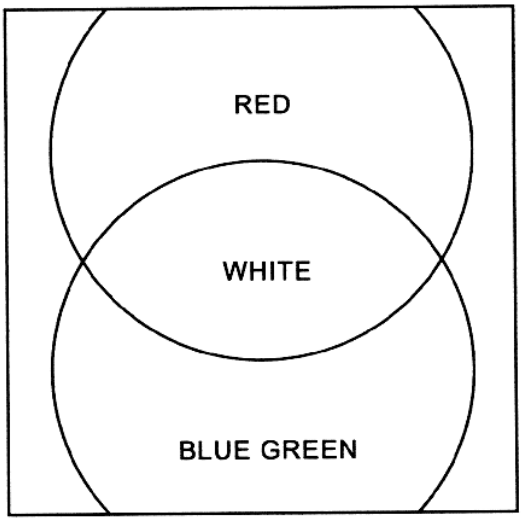
EXPERIMENT NO. 5: CO MPLIMENTARY COLORS (THREE COLORS)

Restore the set-up used in Experiment 2, as shown in Figure 1. With all three lamps on but with the red lamp toned down, there appears on the screen three primary colors and a white patch at the center surrounded by three mixtures, each resulting from the addition of two primaries.

Adjust the rheostats a little differently from Experiment 2, sacrificing some of the pure white in the center to obtain more purple for the red-blue binary; similarly, adjust so that red-green binary is slightly purer yellow. The result is the following complimentary colors; red opposite blue-green; yellow opposite blue; and purple opposite green.

EXPERIMENT NO. 6: COMPLEMENTARY COLORS (TWO COLORS)

Complementary pairs may also be studied, using only two filters at a time, Figure 3. Thus, if a blue-green filter and a red filter is used in the right and left positions respectively, a fairly pure white results at their overlapping area.



COMPLEMENTARY COLORS
Figure 3

EXPERIMENT NO. 7: COLOR FATIGUE

Darken the room only to the point where one is just unable to read. Rotate filter wheel 2 to the red filter. With the lamp at "bright", allow the red disk to appear on the screen for one minute, instructing the members of the class to gaze steadily at the red disk during this minute interval. Turn off the lamp but as the members to continue gazing on the screen to detect a bluish-green disk. This bluish-green fatigue image may not appear immediately after the red light is turned off; in fact, it may appear at different times for different eyes. Blue-green is the complementary color of red.

EXPERIMENT NO. 8: CONTRAST EFFECT

Have the room only medium dark. Using filter wheel No. 2 and the red filter, have the light at “bright”. Flash the red disk momentarily on the screen and the gray background surrounding the red disk will appear greenish by contrast.

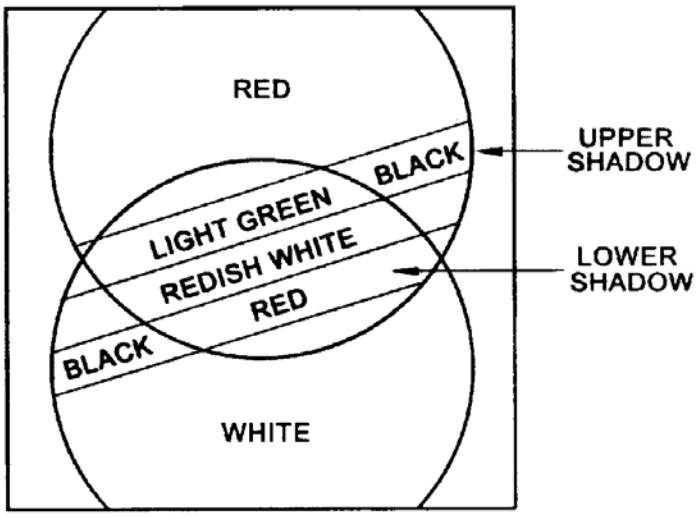
EXPERIMENT NO. 9: SHADOWS BY TWO COLORED LIGHTS

Rotate filter wheel No. 1 to use the red filter. Rotate filter wheel No. 2 to use the blue filter. Set the rheostat in for the two filters at half intensity. Turn the third light off. Swing the shadow rod down into a diagonal position by turning the knob at the upper right corner of the screen. The rod cuts diagonally across the first part of the red disk, then across the purplish-pink overlapping area and then across the disk of blue, Figure 4.

To increase the distinctness of the shadow, pull the knob of the shadow rod forward. It will be noticed that each shadow has two parts; only that portion of the upper shadow crossing the red disk is black, the part crossing the common area being blue. The upper shadow is due chiefly to cutting off the red light and its upper portion appears black because there is no light except red to be cut off, is still illuminated by the blue light.

Now observing the shadow rod where it crosses the blue light, the upper shadow now appears black. Similarly, the lower shadow, because of cutting off the white light, appears black and the common area is red because there is no white light to dilute the red to a weaker tint.

By using three colors, for example the three primaries, the effects are similar but more complicated.



COMPLEMENTARY SHADOWS, ONE COLOR AND WHITE LIGHT

Figure 4

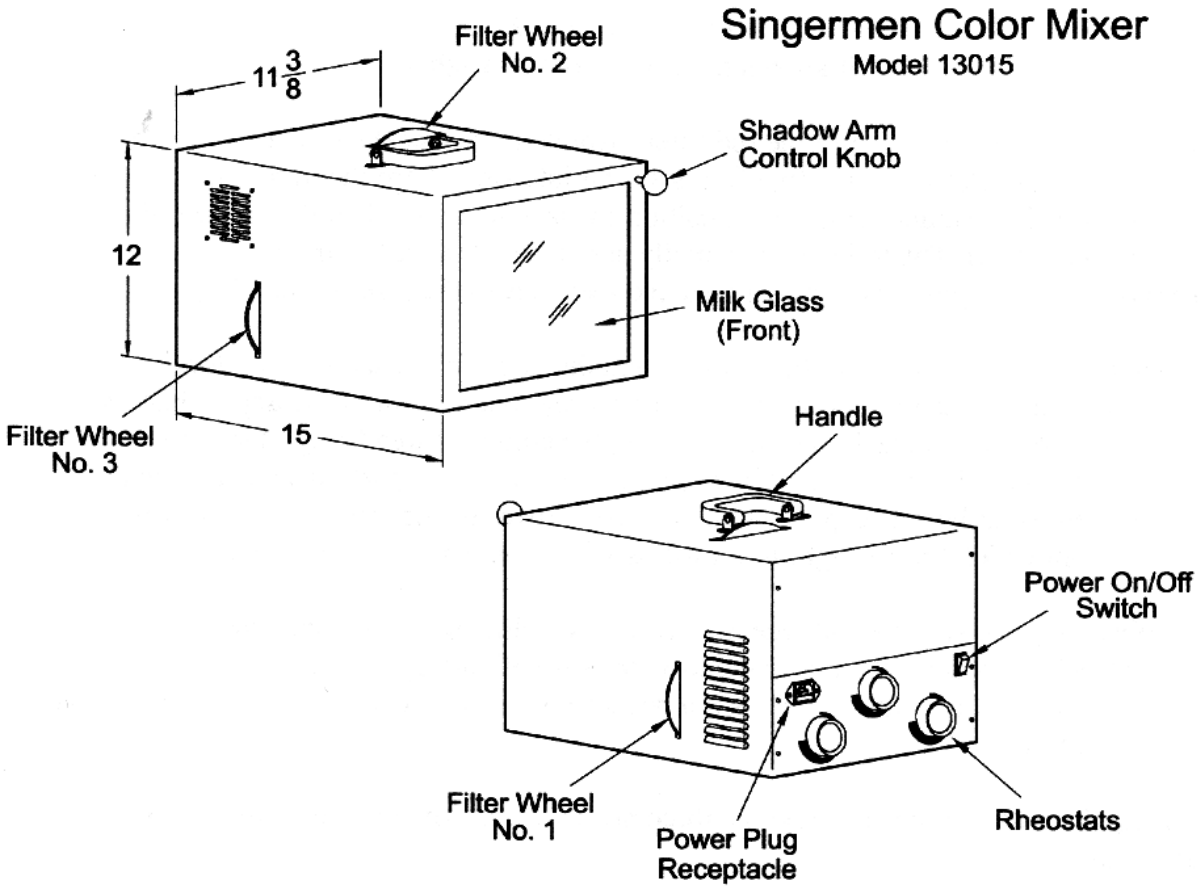


Figure 5

While the foregoing are perhaps the most important demonstrations possible with Singerman's Color Apparatus, others will no doubt suggest themselves as the demonstrator become more familiar with the possibilities of this new device.

Ordering Information:

All phone orders must be accompanied by a hard copy of your order. All must include the following information:
1) Complete billing and shipping addresses
2) Name and department of end user
3) Model number and description of desired item(s)
4) Quantity of each item desired
5) Purchase order number or method of payment
6) Telephone number

DOMESTIC TERMS

There is a $50 minimum order. Open accounts can be extended to most recognized educational institutions, hospitals and government agencies. Net amount due 30 days from the date of shipment. Enclose payment with the order; charge with VISA, MasterCard; or pay COD. We must have a hard copy of your order by mail or fax. Students, individuals and private companies may call for a credit application.

INTERNATIONAL PAYMENT INFORMATION

There is a $50 minimum order. Payment must be made in advance by: draft drawn on a major US bank; wire transfer to our account; charge with VISA, MasterCard; or confirmed irrevocable letter of credit. Proforma invoices will be provided upon request.

RETURNS

Equipment may not be returned without first receiving a Return Goods Authorization Number (RGA).

When returning equipment for service, please call Lafayette Instrument to receive a RGA number. Your RGA number will be good for 30 days. Address the shipment to: Lafayette Instrument Company, 3700 Sagamore Parkway North, Lafayette, IN 47904, U.S.A. Shipments cannot be received at the PO Box. The items should be packed well, insured for full value, and returned along with a cover letter explaining the malfunction. Please also state the name of the Lafayette Instrument representative authorizing the return. An estimate of repair will be given prior to completion ONLY if requested in your enclosed cover letter. We must have a hard copy of your purchase order by mail or fax, or repair work cannot commence.

WARRANTY

Lafayette Instrument guarantees its equipment against all defects in materials and workmanship to the ORIGINAL PURCHASER for a period of one (1) year from the date of shipment, unless otherwise stated. During this period, Lafayette Instrument will repair or replace, at its option, any equipment found to be defective in materials or workmanship. If a problem arises, please contact our office for prior authorization before returning the item. This warranty does not extend to damaged equipment resulting from alteration, misuse, negligence or abuse, normal wear or accident. In no event shall Lafayette Instrument be liable for incidental or consequential damages. There are no implied warranties or merchantability of fitness for a particular use, or of any other nature. Warranty period for repairs or used equipment purchased from Lafayette Instrument is 90 days.

DAMAGED GOODS

Damaged equipment should not be returned to Lafayette Instrument prior to thorough inspection.

When a shipment arrives damaged, note damage on delivery bill and have the driver sign it to acknowledge the damage. Contact the delivery service, and they will file an insurance claim. When damage is not detected at the time of delivery, contact the carrier and request an inspection within 10 days of the original delivery. Please call the Lafayette Instrument Customer Service Department for a return authorization for repair or replacement of the damaged merchandise.

Lafayette Instrument®

3700 Sagamore Parkway North
P.O. Box 5729 • Lafayette, IN 47903 USA
Tel: 765.423.1505 • 800.428.7545
Fax: 765.423.4111
E-mail: info@lafayetteinstrument.com
www.lafayetteinstrument.com

Lafayette Instrument Co. Europe
4 Park Road, Sileby,
Loughborough, Leics., LE12 7TJ. UK.
Tel: +44 (0)1509 817700
Fax: +44 (0)1509 817701
E-mail: EUsales@lafayetteinstrument.com