

No. 776,515

PATENTED DEC. 6, 1904.

F. E. IVES.  
SAFETY COMPOSITE COLOR PRINT.

APPLICATION FILED SEPT. 14, 1903.

NO MODEL.

Fig. 3.



Fig. 1.

	H	G	F	E	D	C	B	A	
1				—					Rhodamine Pink Methyl Blue
2				—	—				Capri Blue Methyl Blue
3					—	—			Capri Blue Victoria Green
4	—	—	—		—	—			Brilliant Yellow Victoria Green
5			—	—	—				Eosine Red Methyl Violet
6			—	—					Eosine Red Naphthol Orange
7				—	—				Rhodamine Pink Methyl Violet

Fig. 2.

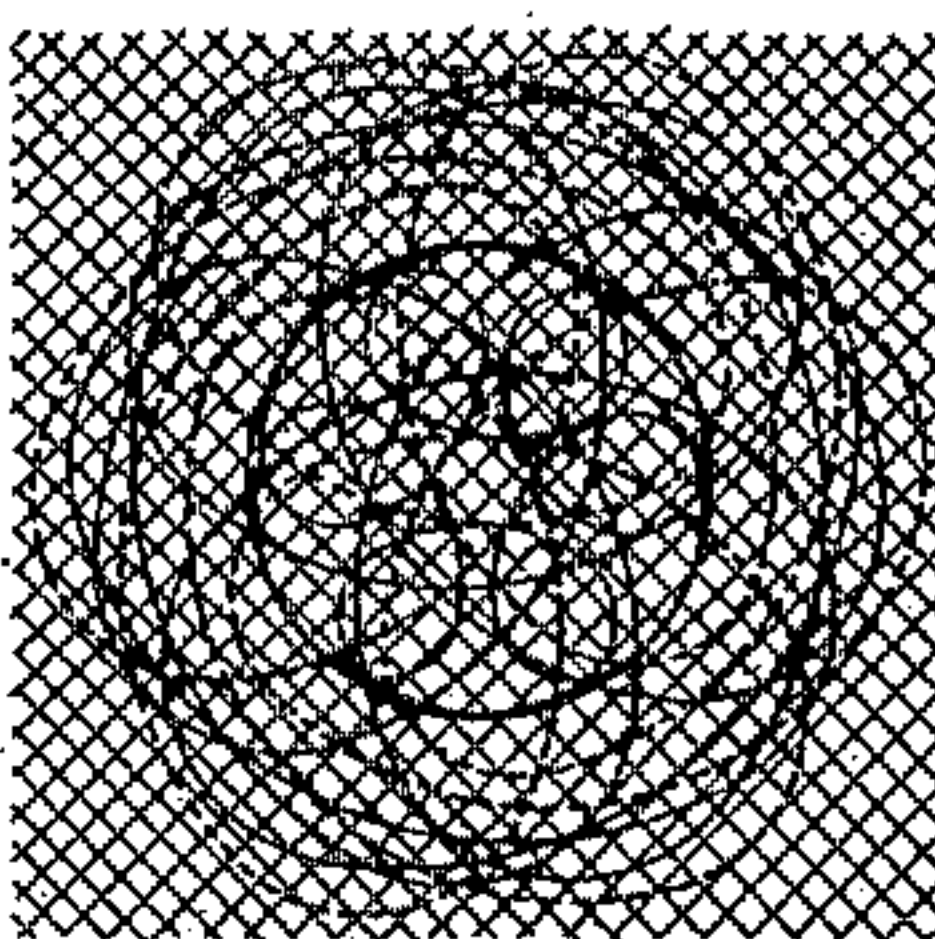
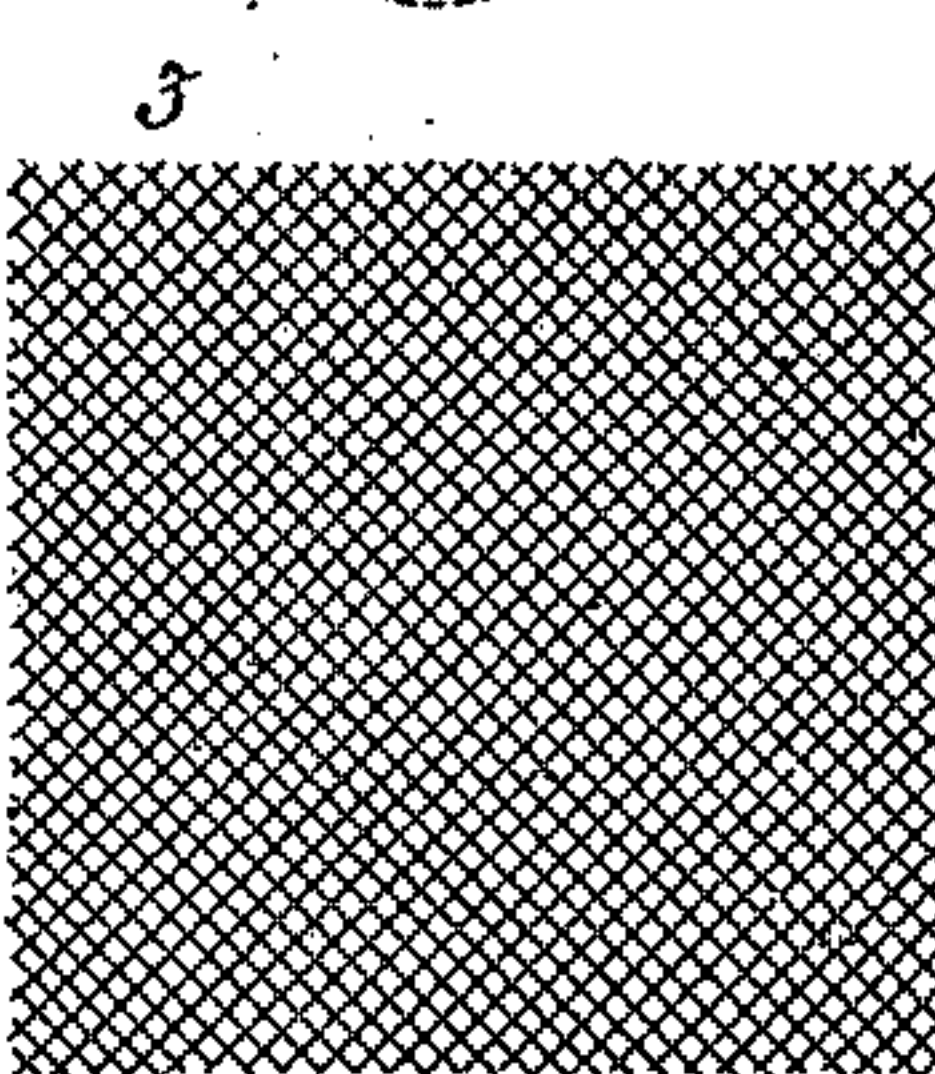
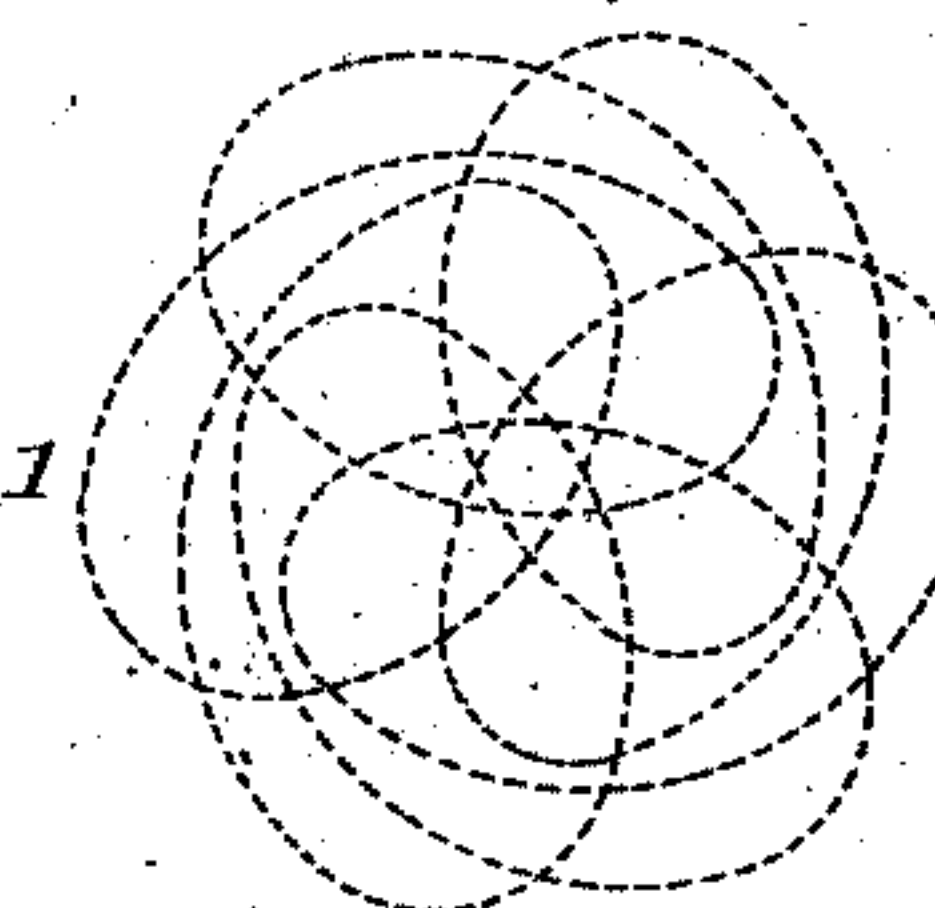
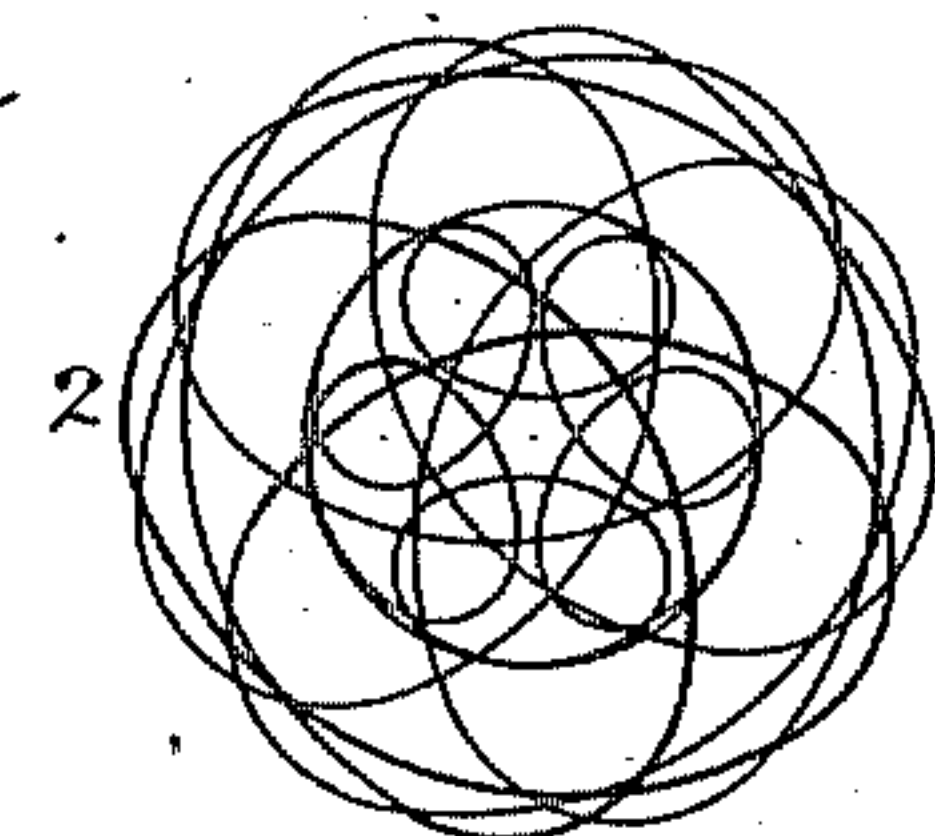


Fig. 4.

Witnesses:

Louis H. Buck

Titus H. Jones

Inventor:  
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by his Attorneys,  
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# UNITED STATES PATENT OFFICE.

FREDERIC E. IVES, OF WEEHAWKEN, NEW JERSEY.

## SAFETY COMPOSITE-COLOR PRINT.

SPECIFICATION forming part of Letters Patent No. 776,515, dated December 6, 1904.

Application filed September 14, 1903. Serial No. 173,139. (No model.)

*To all whom it may concern:*

Be it known that I, FREDERIC E. IVES, a citizen of the United States, residing in Weehawken, New Jersey, have invented certain Improvements in Safety Composite-Color Prints, of which the following is a specification.

The object of my invention is to provide a composite-color design made up of well-differentiated hues of such character as will make it difficult or impossible to reproduce separately one or more of its elements by a photographic process, thereby preventing reproduction of the design by photomechanical means.

In the accompanying drawings, Figure 1 is a diagrammatic view illustrating the relation to the solar spectrum of different combinations of colors which I may use in carrying out my invention. Fig. 2 is a view showing different elements of a safety composite-color print made in accordance with my invention. Fig. 3 is an exaggerated section of part of the complete print, and Fig. 4 is a view showing superposed the different elements of the composite print.

In carrying out my invention I print different designs in different colors superposed upon the same surface, preferably with crossing and interweaving of the lines of the different designs, thus forming a composite-color design. It is desirable that the colors or designs employed should have quite distinctive hues, so that each may be readily recognizable as a characteristic feature of the composite-color print. Such composite-color designs can be made which are not proof against photographic dissection, because each color absorbs strongly some spectrum-ray to which every other color is transparent. In place of such a combination, therefore, I employ inks in pairs which while well differentiated in hue absorb similar spectrum-rays. I preferably employ in each pair a key color and a check color, the latter absorbing those spectrum-rays which are absorbed by the lighter or key color, so that the key-color design cannot be photographed as black without at the same time photographing as black the companion or check color design of a different hue.

Pairs of colors more or less perfectly meeting the aforesaid requirements are as follows, the first color of each pair being a key color and the second a check color: rhodamine-pink and methyl-blue, capri-blue and methyl-blue, capri-blue and Victoria green, brilliant yellow and Victoria green, eosin-red and methyl-violet, eosin-red and naphthol-orange, rhodamine-pink and methyl-violet. The relation of these colors to each other is shown in Fig. 1, in which 1 2 3 4 5 6 7 represent divisions of the visible spectrum of sunlight, the vertical lines being the Fraunhofer lines, which serve as natural divisions between the most distinctive spectrum colors and the heavy horizontal black lines representing the relative spectrum absorption of the printing colors named at the right. It should be understood that this representation of the various absorptions is merely diagrammatic. Any number of such colors may be used to print separate designs to form characteristic parts of a whole; but the principle may be illustrated by a composite design in two colors only. Thus in Fig. 2 the design shown by dotted lines 1 may represent a key color—say rhodamine-pink—and the design shown by full lines 2 a suitable check color of different hue—say methyl-blue.

The check-color design may be separately photographed as black on a white ground by the action of the orange-red spectrum-rays; but the key-color design can only be photographed as black by the action of the yellow-green spectrum-rays, which would also photograph the check color as black and so fail to separate the key design.

It will be evident that the same color which here serves as a check color for the rhodamine-pink-color design would also serve as a check color for a capri-blue key-color design, and there would be a combination of two key-color designs and one check-color design with all of the hues quite distinctive, and the two protected key-color designs would only less perfectly protect the check-color design itself. It is also evident that the check color (methyl-blue) is optically similar to a mixture of the two key colors (capri-blue and rhodamine-pink) and that such a mixture may be



substituted for the methyl-blue—in fact, such a mixture of two key colors forms a very acceptable check color.

In most cases the spectrum absorption of a check color extends in one direction only beyond that of the key color, making it optically similar to a mixture of two key colors. At 7 in Fig. 1, however, an example is given in which the spectrum absorption of the check color (methyl-violet) extends both to the right and to the left of the spectrum absorption of the key color, (rhodamine-pink,) although the two colors are well differentiated.

Owing to the fact that the check colors absorb more of the spectrum and are therefore deeper to the eye than the key colors, I prefer to make the check-color designs in somewhat finer lines than the key-color designs.

It may happen that the colors employed have unlike absorptions in the dark ultra-violet rays of the spectrum, which are invisible to the eye, but to which photographic plates are sensitive, and I therefore prefer to employ as an additional check a white or colorless ground or design in a substance—such, for instance, as white lead—which strongly absorbs the ultra-violet spectrum-rays. Such ground design is shown by the cross-lined element 3 of Fig. 2, although in practice the lines or other elements of the ground design will not be visible to the eye.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. A safety composite-color print comprising

ing two different designs printed one upon the other, each in a distinctive color, the spectrum absorption of one color comprising that of the other.

2. A safety composite-color print comprising two different designs printed one upon the other, each in a distinctive color, the spectrum absorption of one color comprising that of the other, in combination with a ground or design in a white or colorless material opaque to ultra-violet spectrum-rays.

3. A safety composite-color print having a design in white or colorless material opaque to ultra-violet spectrum-rays.

4. A safety composite-color print consisting of several superposed designs each printed in a distinctive color, but with the spectrum absorption of at least one of the colors comprising that of another.

5. A safety composite-color print consisting of several superposed designs each printed in a distinctive color but with the spectrum absorption of at least one of the colors comprising that of another, in combination with a ground or design in white or colorless material opaque to the ultra-violet spectrum-rays.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FREDERIC E. IVES.

Witnesses:

WILL. A. BARR,  
JOS. H. KLEIN.