

course, may be arranged in the same manner. The foregoing is effected by a cylindrical mirror, or cylindrical lenses, which are arranged between the lens and the picture. The latter is thus lengthened or shortened when desired, in one way only. It is sufficient to properly arrange the cylindrical mirror or cylindrical lenses, and then to adjust them by means of a screw fastened to the lens, in order to obtain the desired shortening or lengthening of the image, according to the proportion required between warp and weft ends. For simplifying the adjustment the screw has a scale, which gives all the proportions between warp and weft.

After projecting the object upon the number of squares required both for length and width, the focussing screen is withdrawn and replaced by the chief screen, which is firmly fixed in a dark slide. Behind the chief screen is arranged a sensitive paper, the film of which is placed against the screen. The back of the paper is covered and made light-proof by the lid, and its front is protected by an adjustable shutter. After a short exposure and the necessary development, the photographic paper shows a squared picture which represents the finished design. The squares appear black on light ground and white on black ground. The outlines of the image appear in full squares. This is effected by the chief screen being arranged at a given distance farther from the objective of the dark slide than the focussing screen, through which the picture is no longer projected in its original sharpness.

It is known that different colors in photography have a different effect; therefore, the design of a colored picture appears in two different tones. Two tones, gray and black, upon a white ground, can easily be defined in card cutting. Thus, pictures of three colors, each of which causes a different effect in photography, give a design complete without any addition or alteration whatever. There being, however, many different colors, which, when photographed, are hardly distinguishable by the human eye, it is necessary to paint the object according to a scale of colors specially constructed for this purpose, and always to be adhered to, two of a photographically indistinguishable effect never being applied against one another, which causes no difficulty whatever.

If the object is composed of more than three (for instance, six) different colors, we must repaint three of the tones on the design with a transparent color. For nine-color objects we must use three colors, etc. In this way a quite sharp design can be obtained, for in repainting three tones with red, for instance, a light red, a gray red, a dark red ground is formed according to the white, gray or dark ground. The repainting of such a design does not require any considerable amount of time or practice. Such a design already, with squares only, obtained by the use of the chief screen, can be used for weaving purposes in a great many instances.

To obtain the positive screen more exact, more beautiful and cheaper, we recommend that it be composed of single parts, printed in any desired manner on a greater scale. The expenses of a screen suitable for 800 platinas would be about 10s. Thousands or any number of designs

can be produced with one screen thus obtained, each of which would then cost about 1s. to 2s. The photographic apparatus used for designing is most simple, but it may even be replaced by a camera obscura. A photograph studio is not required; a light room will do. In case of need the designing with screens can be done during the night and with artificial light. The present invention opens new prospects, for instance, for portrait weaving. It is possible to obtain natural images with technical effects that were previously unattainable. The invention is of equal importance for weaving plush, damasks, paramount, curtains, carpets, gobelins, etc.

For a few shillings and in the course of a quarter of an hour we can make any designs whatever, and these ready for card cutting, which up to now have required a great amount of expenditure in both time and money. These designs have the advantage of being entirely free from all defects which were previously unavoidable by human hands and eyes, for in the photographic process the bindings are mechanically designed by the light. The fear that designers may be displaced will, as it has done many times before, prove unfounded. As the designing will not take much time nor require the expenditure of much money, many new designs will be combined and constructed, so that they can be otherwise employed. The writer does not hesitate to admit that he had great doubts as to the merits of the invention at the beginning, but after a thorough study and practical test he is convinced of the great utility and perfect success of the invention, and he hails it as a process which opens up quite new prospects to the textile industry.

ANALYSIS OF FABRICS.

There are various means adopted for determining the material of which the cloth is made, and, in the case of mixture yarns, how to ascertain of what the mixture is composed, and the relative quantities of each. A common and ready way for finding the difference between animal and vegetable fibers is to burn some of the threads of yarn in a flame. The vegetable fiber is composed of carbon, hydrogen, and oxygen, while the animal fiber, in addition to these, contains nitrogen. By burning, the threads used in testing the first mentioned fiber will result in carbonic acid and water, while those of the latter, or of animal fiber, will result in combinations containing nitrogen, which element readily makes itself known by its peculiar smell, or disagreeable odor, similar to burnt feathers. Another point, which it is well to note, is the rapidity with which the thread composed of vegetable fibers burns, as compared with the thread having an animal substance as its basis. In the latter case, only a little bunch of porous carbon forms itself at the end submitted to the flame, and there is no flame, as in the case of the former. Another method is to untwist the threads, and note carefully the appearance of the released fibers. If they are wool fibers, they will be waved in exactly the same way as in the raw wool—the finer the wool, the greater the number of waves or corrugations that will be shown. On the other hand, cotton fibers will maintain the same straightness which