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METHOD OF GRADING PIECES OF MATERIAL FOR VARIATIONS IN COLOR.
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1,294,741.

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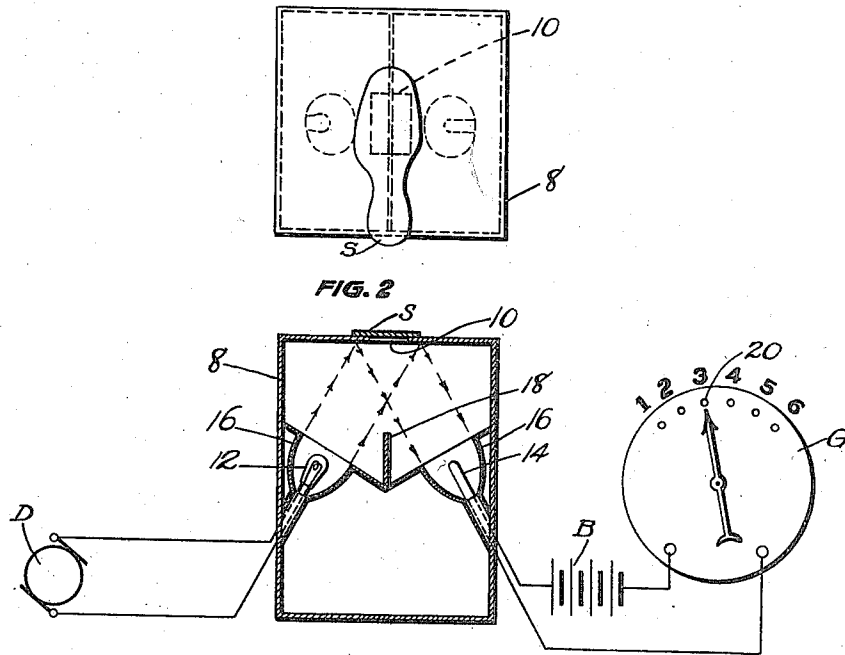


FIG. 1

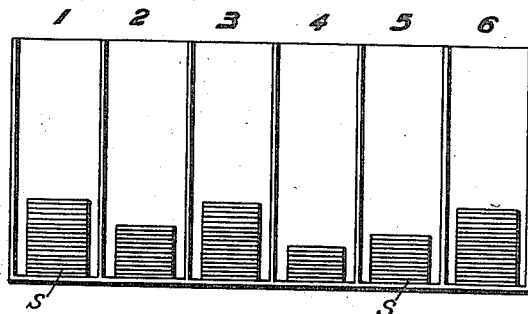


FIG. 3

WITNESS
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METHOD OF GRADING PIECES OF MATERIAL FOR VARIATIONS IN COLOR.

1,294,741.

Specification of Letters Patent.

Patented Feb. 18, 1919.

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To all whom it may concern:

Be it known that I, ERASTUS E. WINKLEY, a citizen of the United States, residing at Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Methods of Grading Pieces of Material for Variations in Color; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a method of sorting or grading pieces of material. As illustrative of one use of the invention it will be described in connection with grading pieces of shoe stock.

As is well known the color of different "sides" of tanned leather hides varies considerably even when the different sides are tanned by the same process. Thus there may be quite a distinct variation in color between two sides of "oak" or of "hemlock" leather, for example, or even a variation in color between different parts of the same side.

In making boots and shoes it is always desirable to have the two shoes of a single pair alike in all respects, not merely in contour and other dimensions but also in color. This last desideratum is especially applicable to the soles and the top-lifts of the heels when these parts which are composed of sole leather, are left unstained in the finished shoe.

In present day shoe factories soles and top-lifts are sorted for color, if at all, by the eye of the workman with the result that in the finished shoe there is often a marked discrepancy between the color of the soles or of the heels of the two shoes of a single pair.

The object of the present invention is to provide for an accurate grading of pieces of material, and more particularly soles, top-lifts, or like pieces of shoe stock, for their differences in color.

In accordance with this object the invention contemplates the use of an apparatus which will accurately determine the color of any particular piece to be graded, within a certain range of shade, and will indicate the color in such a way that the workman may assemble together all pieces of approxi-

mately the same color, or within a predetermined limited range of a particular shade of color.

The invention, therefore, comprises a method of accurately grading the variations in color of pieces of material, more especially soles and top-lifts for boots and shoes, a plurality of which are ultimately to be used together.

An understanding of the invention will be assisted by reference to the accompanying drawings illustrating, partly diagrammatically, a rough apparatus which may be used in carrying out the method, in which—

Figure 1 is a diagram illustrating, partly in vertical section, the apparatus in question. Fig. 2 is a plan-view of a portion of the apparatus, and Fig. 3 is a front-elevation of a series of bins into which the pieces are assorted.

The accurate determination of the color of any piece, by the preferred means of practising the present method, rests on the property of crystalline selenium by reason of which it offers greater resistance to an electric current in the dark than in the light.

A light-tight box 8 is provided, having an opening 10 in its cover which is closed by placing the piece to be operated on, such as the sole S, over it. Within the box is mounted an electric bulb 12 and a selenium cell 14, preferably of the Ruhmer type, in the manner indicated in Fig. 2, so that a beam of light is directed obliquely upon the surface of the piece. Each of the last named parts is provided with a parabolic reflector 16. The reflector about the light directs its rays to the opening 10 and the reflector about the selenium cell directs into the cell the rays of light reflected from the surface of the sole S. Between the light and the selenium cell is a partition 18 which prevents stray rays of light from reaching the cell, the cell being affected only by such rays as are reflected thereto from the surface of the sole.

The electric light may be in any convenient light circuit, as indicated by the dynamo D and connected electric wires. The selenium cell may be connected in circuit with a battery B, and a galvanometer, or other suitable electric current measuring instrument, indicated at G. The adjuncts of the battery circuit, such as resistance boxes,

relays, etc., it is not deemed necessary to indicate in the drawing, it being understood that all such devices as may be used are old and well known.

5 For purposes of explanation the scale 20 on the galvanometer is arranged for six different colors or degrees in shade of color, and in Fig. 3 six bins are shown, wherein the soles may be deposited in different grades
10 in accordance with the readings of the galvanometer.

The manner of practising the method is simple and will be readily understood. Soles, or other pieces to be graded are laid,
15 one by one, over the opening 10 in the box 8, and the bulb 12 being lighted, its light is reflected from the sole and rays gathered into the selenium cell 14. As the color of the soles being graded varies from light to
20 dark the resistance set up in the cell will be diminished and increased, resulting in greater or lesser movements of the galvanometer needle across the scale 20. If the first sole is very dark in color the indicated
25 reading will be, say, somewhere between 1 and 2 on the scale 20, while a lighter sole will give a higher reading. Each sole will be placed by the workman in the bin marked for the grade indicated by the galvanometer.
30 For any single pair of boots or shoes two soles or lifts of any color grade, *i. e.*, from any one bin, may be used. For a manufacturing order of shoes, which specifies that all pairs must be uniform in coloring, soles and
35 lifts of a single grade will be used in filling the order.

In this specification the word "color" has been used in the sense in which it is commonly used with respect to the grading of
40 shoe-stock, namely, as indicating not only the color proper or hue, but also the tone

or shade of the color. Since the selenium cell is more sensitive to certain colors than to others, and is also sensitive to gradations in the intensity or tone of any given color, 45 it will be apparent that it may be employed to grade pieces of material in accordance with either of these factors if the other factor be constant. In the grading of shoe-stock the factor of color in a strict sense is usually constant, that is to say, the method will usually be carried out upon a lot of pieces of shoe material of the same tannage, so that the variations between the pieces will be rather of tone than of absolute color, and 50 in this way the desired result is secured since it is similarity in the tone of the material used in a pair or in a lot of shoes which it is most desirable to secure.

Having thus described the invention and 60 the preferred manner of practising it, it is definitely stated in its true scope in the following claims.

What is claimed as new, is:

1. The method of grading pieces of material which consists in subjecting the pieces severally to illumination substantially uniform in character and intensity, measuring the intensity of the light reflected from the pieces, and sorting the pieces according to 70 a scale of such intensities.

2. The method of grading pieces of material which consists in subjecting selenium to the light reflected from the pieces severally when subjected to illumination substantially uniform in character and intensity; 75 and sorting the pieces according to a scale based upon the variations in the electrical resistance of the selenium resulting from the variations in the intensity of the light so 80 reflected.

ERASTUS E. WINKLEY.