June 5, 1923. 1,457,805

D. E. WOODHULL

SAFETY TINT PAPER

Filed July 15, 1921

Fig. 1.

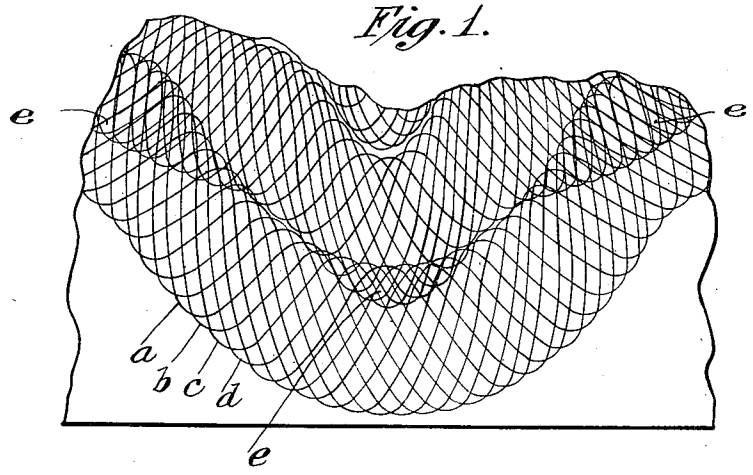
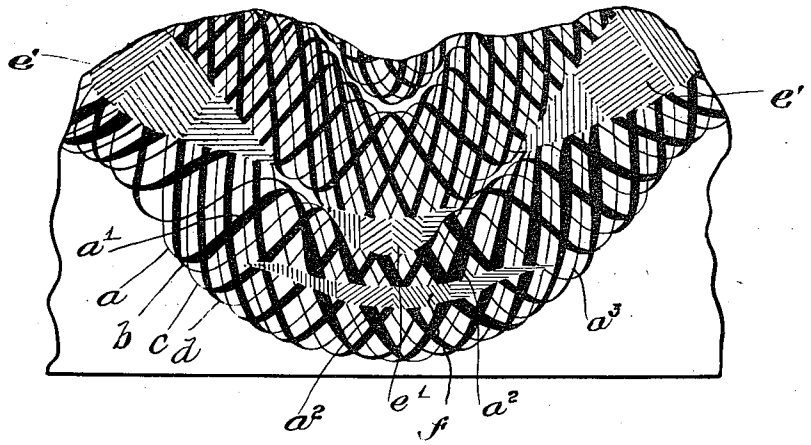


Fig. 2.



Daniel E. Woodhull Inventor

By his Attorney

Frank T. Wentworth

Patented June 5, 1923. 1,457,805

UNITED STATES PATENT OFFICE.

DANIEL E. WOODHULL, OF NEW YORK, N. Y., ASSIGNOR TO AMERICAN BANK NOTE COMPANY, A CORPORATION OF NEW YORK.

SAFETY-TINT PAPER.

Application filed July 15, 1921. Serial No. 485,031.

To all whom it may concern:

Be it known that I, DANIEL E. WOODHULL, a citizen of the United States, residing at the borough of Manhattan, in the city, county, and State of New York, have invented certain new and useful Improvements in Safety-Tint Paper, of which the following is a specification, reference being had therein to the accompanying drawings, which form a part thereof.

My invention relates to safety tint paper, and more particularly to those characteristics thereof which will make counterfeiting of bank notes and negotiable instruments more difficult, or the detection of counterfeits more certain.

Safety tints upon paper used for some bank notes, checks, drafts, letters of credit and other negotiable instruments usually consist of a fine line scroll geometrical design impressed upon the paper in colored inks which may not be photographed readily, the usual practice being to create a geometrical design by means of a rose engine or pantographic machine, and to combine different arbitrarily selected portions of the design so formed in a printing plate either engraved or acid-etched, so as to permit the making of an impression of a safety tint of the desired dimensions to form a background upon the paper prior to the making of other impressions thereon.

Prior to my invention, the production of the design was mechanical throughout, so that a skilled operator with a rose engine or pantographic machine could, with considerable difficulty however, reproduce the safety tint design with sufficient accuracy to make the detection of a counterfeit note or instrument difficult. In all such designs, all of the lines were of the same width, as determined by the tracing stylus of the rose engine or pantographic machine, excepting where the lines crossed and recrossed in close proximity and in large numbers, where under a magnifying glass the effect was irregular and blotchy.

All such designs, prior to my invention, showed evidence of their mechanical origin, lacking those distinctive characteristics present in hand work.

Heretofore, to obviate this condition, these safety designs have been printed in different colors as to different parts thereof and sometimes with chromatic effects as to other parts thereof, which somewhat increased the factor of safety in such papers but did not correct the mechanical aspects of the design.

With the above conditions in mind, I have produced a paper having a safety tint formed of a line scroll or geometrical design having all the superficial characteristics of a design produced by a rose engine or a pantographic machine, but differing therefrom in that upon careful inspection even with the naked eye variations from the usual mechanical effects are readily observable. Such a tint design cannot be reproduced mechanically as can the ordinary rose engine of pantographic design, and has characteristics which will permit it to be instantly distinguished from an attempted mechanical reproduction thereof, and when it appears in a plurality of different colors, or in chromatic color effects, in a manner more fully described hereinafter, cannot be readily reproduced photographically for purposes of counterfeiting.

The invention consists primarily in safety tint paper having impressed thereon a line geometrical design of the general character of a machine-made design having the lines of some of the loops relatively wider than the lines of adjacent loops, whereby possibility of a mechanical reproduction of the design for counterfeiting purposes is minimized; and in such other novel characteristics as are hereinafter set forth and described, and more particularly pointed out in the claims hereto appended.

Referring to the drawings,

Fig. 1 is a view of a fragmentary portion of a geometrical line design mechanically produced; and

Fig. 2 is a similar view showing the modification of this design as used in safety paper embodying my invention.

Like letters refer to like parts throughout both of said views.

As shown in Fig. 1 of the drawings, the ordinary geometrical design used for tint

work for bank notes and some negotiable instruments is formed from a medallion design composed of a sequence of loops or convolutions in a continuous line, succeeding convolutions being spaced a short distance apart and each loop being constricted toward the center of the design. The result is a figure having a more or less fluted edge with light tonal effects adjacent thereto, there being a deepening of these effects toward the center of the design wherein the lines are very much closer together and frequently cross and re-cross each other in a manner to form solid masses of color between the center of the design and the outer edge thereof. By using very narrow lines and pastel color effects, and by using colors which will absorb light rays to an extent to make it difficult even with highly sensitized plates to secure a photographic reproduction thereof, a reproduction of the printed design by means of photo-engraving is practically eliminated because of the difficulty of securing in the engraved plate continuity of the line forming the design.

For the purpose of more clearly explaining the invention, the figures of the drawings are shown upon a very much enlarged scale, and four succeeding loops of the continuous line forming the design are indicated at *a*, *b*, *c* and *d* respectively, and the deeper toned portion toward the center of the design, being indicated at *e*.

The safety tint design may be secured by selecting only portions of this design and reproducing it a large number of times by means of transfers, or the completed geometrical design may be used with the medallion effect in certain portions of the note or instrument.

It will be readily understood that one skilled in the use of a rose engine or pantograph might readily reproduce any design of this character, the paper of my invention bearing a safety tint design developed from and having the general character of, that produced by means of a rose engine or pantograph, but varying therefrom in characteristics which cannot be mechanically reproduced.

As shown in Fig. 2 of the drawings, this result is secured by arbitrarily selecting certain lines of certain loops in the design and making them considerably broader than lines of the adjacent loops, thus imparting a noticeable and unusual variation in the effect of the tint design so that any one familiar with a safety tint paper embodying my invention, can at a mere glance distinguish it from a mechanically produced design.

The widened lines of the loop, as in *a*, may be made of uniform width throughout as indicated at a' in Fig. 2, or may be of graduated width from that of the width of the line of the loop *b* to the maximum width of the line *a* as indicated at a^2 in Fig. 2, or one side of the loop *a* may be widened and the other side left at the width normally produced by the rose engine or pantograph, as indicated at a^3 in Fig. 2.

As a further safeguard, succeeding loops *a*, *b*, *c* and *d* may be printed in separate colors, or alternate lines or lines otherwise grouped may appear in different colors, the ink of one line overlaying that of another so as to secure absolute continuity of the lines of the design or ensure absolute register of the lines of different loops where they cross.

By having some of the lines of the safety tint of greater width than other lines, a mechanical reproduction of the design is made absolutely impossible, the employment of different colors which may be either solid colors or have chromatic effects, preventing a photographic reproduction of the design with sufficient accuracy to permit successful counterfeiting thereof.

As a further safeguard, the portion *e* of the mechanically reproduced design is deleted, and replaced by an arbitrary, irregularly shaped figure in the design, as indicated in Fig. 2 at e', which could not under any circumstances be the result of the ordinary functioning of a rose engine or pantograph in creating the scroll features of the design.

As a still further safeguard, I sometimes include in the safety tint design of the paper, a small arbitrary figure *f* extending across the lines of succeeding loops intermediate the opposite ends of the loops in any desired position and appearing in any color or group of colors, which figure would not be developed by any machine which might be used for creating the geometrical design of the tint.

The design for a bank note or negotiable instrument is repeated a large number of times upon the paper, and the practical impossibility of reproducing the design photographically and absolute impossibility of reproducing the design mechanically, practically eliminates all possibility of successful counterfeiting of the paper and permits ready detection of attempted counterfeits. The safety tint also makes erasure and alterations in negotiable instruments extremely difficult by reason of the difficulty of accurately restoring the safety design upon the paper when such has been once removed.

When the design of the safety tint of my invention has once been created, it may be impressed upon the paper by the same methods formerly employed.

Paper made in accordance with my invention has a greater safety factor than any other paper bearing a tint design with which I am familiar, and I believe I am the first

to conceive of a safety paper bearing a tint design developed from a mechanically produced geometrical design but varying therefrom as to the characteristics of the lines in a manner to prevent a mechanical reproduction thereof, and I intend to claim such broadly.

It is apparent that the character of the design of the tint may be varied indefinitely and that the arrangement of the widened lines and the arbitrary figures also has a wide range, and that the color schemes are also matters of selection. The foregoing range of possibility as to variations of the paper are necessary in order to permit different lines of notes or negotiable instruments to be readily distinguished one from the other.

Having described the invention, what I claim as new and desire to have protected by Letters Patent, is:—

1. Safety tint paper having impressed thereon a line geometrical design of the general character of a machine-made design having the lines of some of the loops relatively wider than the lines of adjacent loops, whereby possibility of a mechanical reproduction of the design for counterfeiting purposes is minimized.

2. Safety tint paper having impressed thereon a line geometrical design of the general character of a machine-made design having the lines of some of the loops relatively wider than the lines of adjacent loops, whereby possibility of a mechanical reproduction of the design for counterfeiting purposes is minimized, different portions of the lines of said design being in different colors, whereby photographic reproduction of the design is prevented.

3. Safety tint paper having impressed thereon a line geometrical design of the general character of a machine-made design having the lines of some of the loops relatively wider than the lines of adjacent loops, whereby possibility of a mechanical reproduction of the design for counterfeiting purposes is minimized, different portions of the lines of said design being in different colors, and lines of one color overlaying lines of another color at their point of intersection, whereby photographic reproduction of the design is prevented.

4. Safety tint paper having impressed thereon a line geometrical design of the general character of a machine-made design having the lines of some of the loops relatively wider than the lines of adjacent loops, and an irregularly shaped, arbitrary figure adjacent the inner end of the loops forming the design, whereby possibility of a mechanical reproduction of the design for counterfeiting purposes is minimized.

5. Safety tint paper having impressed thereon a line geometrical design of the general character of a machine-made design having the lines of some of the loops relatively wider than the lines of adjacent loops, and a small arbitrary figure extending across the lines of succeeding loops intermediate opposite ends of the loops, whereby possibility of a mechanical reproduction of the design for counterfeiting purposes is minimized.

6. Safety tint paper having impressed thereon a line geometrical design of the general character of a machine-made design having the lines of some of the loops relatively wider than the lines of adjacent loops, an irregularly shaped, arbitrary figure adjacent the inner end of the loops forming the design, and a small arbitrary figure extending across the lines of succeeding loops intermediate opposite ends of the loops, whereby possibility of a mechanical reproduction of the design for counterfeiting purposes is minimized.

7. Safety tint paper having impressed thereon a line geometrical design of the general character of a machine-made design having the lines of some of the loops relatively wider than the lines of adjacent loops, and an irregularly shaped, arbitrary figure adjacent the inner end of the loops forming the design, whereby possibility of a mechanical reproduction of the design for counterfeiting purposes is minimized, different lines of said geometrical design and said arbitrary figure appearing in different colors, whereby photographic reproduction of the design of the tint is prevented.

8. Safety tint paper having impressed thereon a line geometrical design of the general character of a machine-made design having the lines of some of the loops relatively wider than the lines of adjacent loops, and a small arbitrary figure extending across the lines of succeeding loops intermediate opposite ends of the loops, whereby possibility of a mechanical reproduction of the design for counterfeiting purposes is minimized, different lines of said geometrical design and said arbitrary figure appearing in different colors, whereby photographic reproduction of the design of the tint is prevented.

9. Safety tint paper having impressed thereon a line geometrical design of the general character of a machine-made design having the lines of some of the loops relatively wider than the lines of adjacent loops, an irregularly shaped, arbitrary figure adjacent the inner end of the loops forming the design, and a small arbitrary figure extending across the lines of succeeding loops intermediate opposite ends of the loops, whereby possibility of a mechanical reproduction of the design for counterfeiting purposes is

minimized, different lines of said geometrical design and said arbitrary figures appearing in different colors, whereby photographic reproduction of the design of the tint is prevented.

In witness whereof I have hereunto affixed my signature, in the presence of two subscribing witnesses, this 20th day of June 1921.

DANIEL E. WOODHULL.

Witnesses:
ALFRED S. MAJOR,
F. T. WENTWORTH.