March 12, 1946. J. D. ROSS 2,396,391

ALTERPROOFING RECORD MATERIAL

Filed Dec. 29, 1944

FIG. 1

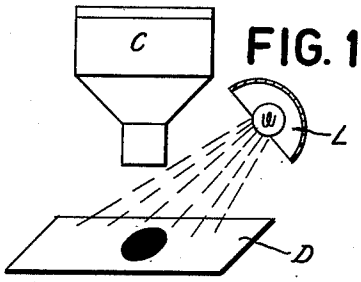


FIG. 2.

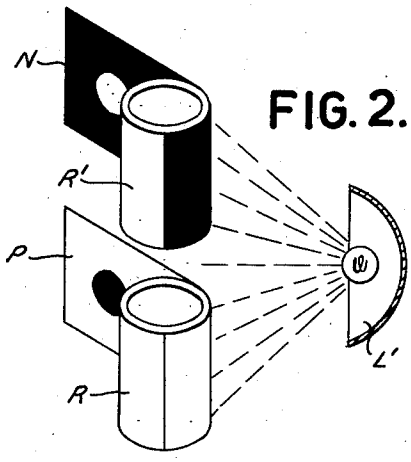


FIG. 3.

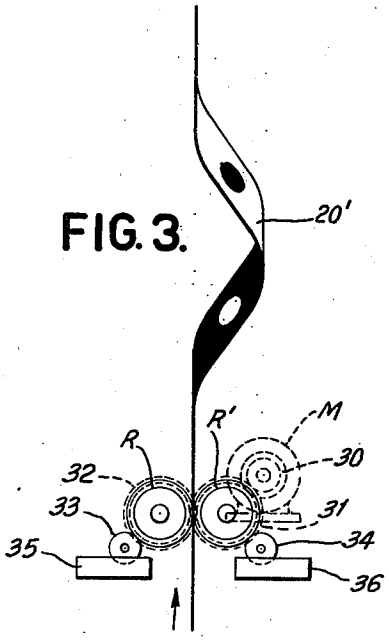


FIG. 4.

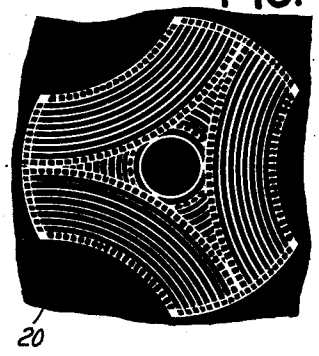


FIG. 5.

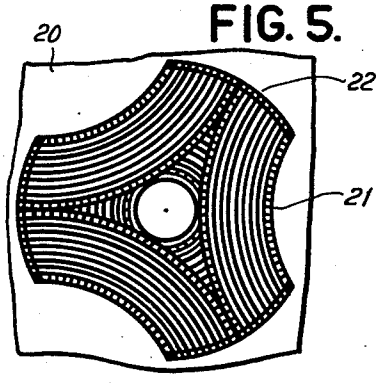


FIG. 6.



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ALTERPROOFING RECORD MATERIAL

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Application December 29, 1944, Serial No. 570,339

15 Claims. (Cl. 117—1)

This invention relates to the production of an alterproof check paper and the method of producing such material. More particularly, the invention is concerned with tinting record material on both sides with negative and positive image deposits of opaque material for blocking out testing light so that erasures may be detected by the passage of light through mistreated areas on the record.

An object of the invention is the production of an improved form of check or bond paper.

Another object of the invention is the production of the record material so tinted as to make alterations thereon readily evident.

Another object of the invention is the provision of a method of tinting record material whereby it is possible to print or record matched negative and positive designs on opposite sides of record material, said designs so coinciding as to form a light blocking opaque appearance. The method or process includes the steps of photographing an intricate design, making a contact positive of the negative film so produced photographically, taking such a pair of films and wrapping them on electro rollers previously coated with photo-sensitive material and exposing the prepared rollers to light for selectively affecting the coat in design areas to be etched on the surface of the two rollers. As a further step in the process, the pair of rollers is geared together or connected by friction in such a manner that the two matched designs coincide and record in an interlocked position on the record material when it is passed between said interconnected rollers which have access to inking sources.

Another object of the invention is the provision of a method of printing on the two sides of a record by means of a pair of rollers or plates prepared from negative and positive films of a design.

Another object of the invention is the production of a safety check or bond paper having erasure detecting tinting on both sides composed of curved interlocking lines printed as complementary designs in matched positions with the darkened lines on one side being opposed by similar clear spaces on the other side.

Other objects of the invention will be pointed out in the following description and claims and illustrated in the accompanying drawing, which discloses, by way of example, the principle of the invention and the best mode, which has been contemplated, of applying that principle.

In the drawing:

Fig. 1 is a diagrammatic showing of the first step in the process which is that of photographing a design.

Fig. 2 is a diagrammatic showing of the step involving the preparation of a pair of matched electro rollers by exposing them to light when covered by the negative and positive films.

Fig. 3 is a diagrammatic view showing the step of printing on a record material fed between the pair of geared electro printing rollers.

Fig. 4 is a detail view showing an enlarged portion of the negative of one unit of an over-all protective design used for tinting one side of a check strip.

Fig. 5 is a detail view also enlarged about ten times and showing the positive form of the same design shown in Fig. 4. This is used for tinting the other side of the same check strip.

Fig. 6 is a sectional view taken through a portion of a check, bond or other record material showing the manner in which the deposits of tinting or other recording material are arranged on opposite sides of the paper, so that together they form a light blocking coating making the entire surface opaque except when disturbed by an erasure or other efforts of alteration.

This invention is concerned with the production of printing devices and record material designed to prevent alteration of commercial paper for, although carefully made changes in the numbers on checks, bonds and the like often pass detection when made on ordinary paper, it becomes increasingly difficult to make such changes on tinted paper. As a further advantage in providing safeguards for the users of such material, the present invention contemplates the matching of tinting on both sides of such material so that, when held up to light, the normal appearance should be that of a solid opaque material, and when any light does shine through, it is a sign that the instrument has been tampered with.

As a first step in the production of the improved record material, a photograph is taken of the design to be used in tinting the record material. This is shown in Fig. 1 where it is seen that the design D is arranged opposite a camera C and light is reflected from the design by the source of illumination L. Although the design shown is a simple spot design used for purposes of illustration, it will be realized that the actual tinting design is an intricate pattern made up of small curved intermeshing lines, such as those of the units shown in Figs. 4 and 5. It is contemplated further that the design should be an

over-all pattern, that is, the small units are matched together and extended to the sides and ends of the recording zone.

After a negative film N is recorded in the camera C, a complemental positive film P (Fig. 2) is prepared in any of a number of ways, one of which is to make a contact recording from the negative film on a blank film in the usual way. After the two films N and P have been prepared, they are wrapped around a pair of similar electro rollers R and R' as shown in Fig. 2. These two electro rollers are previously prepared by having their surfaces coated with photosensitive material, such as an emulsion including ammonium dichromate, citrate of iron, albumen and glue, for providing a coating which is later effective to cause selective etching. As shown in Fig. 2, the pair of rollers is arranged opposite a light source L' and rotated in the field of such light to cause selective photographic effects through the negative and positive films and selective changes are made in the coating under the films and on the surfaces of the rollers. After the rollers have been exposed the proper length of time to the light, the films are removed and the rollers are washed to remove the exposed soluble photosensitive material, and then the rollers are etched in an acid bath or by a combination of acid action and electrolysis to form depressed design areas, which are receptive to ink for recording the design.

When the rollers R and R' are ready for recording, they are mounted in a printing device as shown in Fig. 3. There it is noted that the two rollers are provided with gears **31** and **32**, and they are brought into contact so that the designs thereon match in that the blank spaces of the negative design are opposed directly by the lines of the positive design. Although the rollers are shown connected by gearing, it is possible to use a plain frictional connection or belting or any other driving connection to hold them together so that they turn in synchronism. A motor M is shown provided with a gear **30** meshing with gear **31** to drive the right hand roller R' in a clockwise direction, while gear **32** and roller R are turned counterclockwise, and thereby carry the check strip material **20'** upward so that it is fed through the printing machine to receive the matched printing impressions on both sides as shown diagrammatically.

Also associated with the electro rollers are a pair of ink holders **35** and **36** into which dip a pair of inking rollers **33, 34** which have rolling contact with the periphery of the electro rollers.

One form of protective design for tinting is shown in Figs. 4 and 5. Fig. 4 shows the negative of the unit of design while Fig. 5 shows the related positive image of the same design. The designs of Figs. 4 and 5 shown enlarged about ten times and are restricted to a single unit while the complete design involves repetition of such units with the projecting curved end of one unit abutting into the space **21** of Fig. 5 and another unit curved around the projecting end **22** at the top of the design. In such a way the design is repeated to cover in an over-all pattern the entire check area. It is noted by comparing the lines and spaces of Figs. 4 and 5 that they are complementary in that every open or unprinted space on one is opposed by darkened areas or lines on the other. This is also brought out in Fig. 6 which shows a cross-section of the record material **20** shown in Figs. 4 and 5. In Fig. 6 it is noted that the tinting material or printing ink **23** coated on the top side of a record material is opposed to a blank space flanked by a pair of lines or darkened design areas **24** and **25** on the bottom side of the sheet. Between the effect of tinting on both sides there is provided a light blocking coating which remains effective as long as the check is not tampered with. Upon erasure of the lines of tinting on one side, light is allowed to pass through the check material and reveal an open area or part of the design printed on the opposite side. Any manual effort to reinsert tinting lines or designs will be ineffectual and also fail to provide a complemental light blocking pattern.

While there have been shown and described and pointed out the fundamental novel features of the invention as applied to a single modification, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention. It is the intention therefore to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. A method of making alterproof paper comprising the steps of photographing negative and positive films of a design, coating a pair of similar electro rollers with photosensitive material, covering said rollers with said films and exposing to light, etching said rollers, mounting said rollers in matched design juxtaposition for simultaneous printing impression, and feeding said paper between said rollers.

2. A method of making opaque check paper comprising the steps of printing a design on one side of said paper and printing the negative of said design on the other side of said paper.

3. A method of making light blocking paper comprising the steps of darkening a portion of one side of said paper and darkening the complemental portion on the other side of said paper.

4. A method of preparing alterproof paper by recording an opaque line design on one side of said paper and recording the opaque opposite of said line design on the other side of said paper.

5. A method of preparing alterproof paper by making negative and positive films of a repeated integrated overall design, forming a pair of etched gravure printing rollers with complemental surfaces representative of the negative and positive patterns of said design, gearing said rollers together in a recording association, and feeding said paper against said rollers to receive back and front recordings which together cancel out light ray penetration except in areas subjected to erasure.

6. A method of preparing alterproof paper comprising the steps of forming complemental designs on printing plates, mounting said plates opposite each other in exact matching complemental relation, and impressing said plates against opposite sides of said paper to print thereon opposing light blocking designs.

7. A method of making check paper comprising the steps of photographing a negative film of an over-all line design, making a contact positive film from said negative, coating a pair of matched electro rollers with photosensitive material, wrapping said films around said two rollers, exposing said covered rollers to light, etching the surface of said rollers, gearing said rollers together with the etched designs thereon superim-

posed at the printing contact line, inking said rollers, and feeding said check paper between the inked rollers.

8. A method of forming matched printing rollers comprising the exposure of said rollers under related negative and positive films of the same design, and etching the design positively on one roller and negatively on the other roller.

9. In a printing device, a pair of cooperating electro rollers, one of said rollers bearing the negative pattern of the design of the other roller, and means for gearing the two rollers together to synchronize the designs thereon.

10. An alterproof record having a design on one side and the complement of said design on the other side.

11. A check paper having a printed negative on one side and a printed positive on the other side.

12. An opaque record sheet having a darkened pattern on one side and a complemental darkened negative of said pattern on the other side.

13. A record sheet having light and dark areas on one side and similar but negative light and dark areas on the other side.

14. An alterproof record which is tinted on both sides with an over-all pattern of interlocking curved lines and spaces, said spaces of one side being opposed by darkened areas on the other side.

15. A record sheet bearing on both sides an overall design of an intermeshing triangular pattern of curved lines and interstices, said interstices on one side being fully opposed by a line on the other side.

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