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PAPER AND METHOD OF MAKING SAME FOR OBTAINING FAST COPIES FROM WRITINGS OF ANILIN INKS.

SPECIFICATION forming part of Letters Patent No. 749,684, dated January 12, 1904.

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To all whom it may concern:

Be it known that I, MURRAY H. CHAPIN, a citizen of the United States, and a resident of Bridgeport, in the county of Fairfield, and State of Connecticut, have invented certain new and useful Improvements in Paper and Methods of Making Same for Obtaining Fast Copies from Writings of Anilin Inks, of which the following is a specification.

My invention relates primarily to the preservation of letter-press copies taken from type-written sheets. Letter-press copies are usually obtained by pressing a dampened sheet of tissue upon the type-written or original sheet, whereby the copying-ink which has been deposited upon the latter by the action of the types is dissolved by the action of the water and transferred to or taken up by the tissue sheet. The tissue sheets are usually bound in book form, whereby copies of many letters may be conveniently taken at a single operation of the copying-press and the copied letters retained in convenient form for subsequent reference. Damp cloths are generally used to supply the moisture, the cloth being laid upon the leaf of the copy-book after said leaf has been turned over upon the face of the letter. Brushes are sometimes employed to apply the water. Oiled sheets are used to prevent offset or transference of ink from one page to another of the book or from a page of the book to the front or back side of a fresh letter placed therein to be copied. Blotters are also used to dry out the pages of the book after use and also to prevent offset of the ink from one page to another. The ink of the type impressions dissolves in water so readily that it is liable to spread or wash out to such an extent as not only sometimes to render the tissue copy undecipherable, but also to blur and spoil the appearance of the original sheet. This blurring or washing out is more noticeable when a fresh type-writer ribbon has been used in producing the original sheet, and at this time the ink is more liable to offset from one page to another of the copy-book or from a page of the latter to the front or back of a letter placed in the book to be copied. It fre-

quently occurs that entire letters are offset in this way, so that matters intended only for the eye of one correspondent are conveyed unintentionally to another correspondent as well. It also sometimes happens that the ink from one leaf of a copy-book will soak through many other leaves, rendering all the letters copied thereon nearly undecipherable. Moreover, in the event of a fire occurring in an office building, factory, warehouse, or other establishment the copy-books sometimes become soaked with water from the fire-hose and are thereby ruined, the ink being either entirely washed out by the water or soaking from each page through a score or more adjacent pages, rendering all of the pages utterly undecipherable. Further, the letters or documents produced upon the type-writing machine are open to the objection, when ordinary copying-inks are used, of becoming faded and, perhaps, illegible when exposed to the action of light for a considerable length of time. For this reason legal records are usually made with "record-ribbons," from which press copies cannot be taken. When it is desired to produce a permanent record from which a press copy can be taken, it is necessary to use a specially-prepared "indelible" copying-ribbon.

My objects are to prevent excessive spreading or washing out of the ink during the copying process, to remove the liability of offsetting of the characters from a page of the copy-book either to the surface of a letter placed in the book or to another page of the book, to prevent the characters from being washed out or blurred by becoming accidentally soaked with water, and to render both the original and the copy or copies thereof more permanent and less liable to wear off by handling or to fade when subjected to the action of light.

It will be understood that in making ordinary press copies a certain quantity of ink is absorbed by the tissue sheet—that is, ink is mechanically transferred from the original sheet to the tissue; but as this process does not involve any chemical change in the ink the latter is very susceptible to the subsequent washing-out action of water.

In seeking to attain the objects above mentioned I have discovered that it is possible at the time that the copy is being taken to produce a chemical union of the ink with the tissue, such that thereafter the copy cannot be materially affected by the action of water, and I have also discovered that it is possible to cause a chemical union of the ink with the fibers of the original sheet, so that the original copy may also be rendered permanent—that is, not susceptible to being washed out by water and, like the tissue, not liable to fade materially under the action of light.

I obtain the above results by first subjecting the tissue-paper to the action of a substance which has an affinity for the ink or coloring-matter of the type impressions, so that during the operation of press-copying, when the moisture or water dissolves the color in the ink characters, the said coloring-matter is brought into contact with the above-mentioned substance contained in the prepared paper. This contact causes said substance and the ink to immediately enter into chemical combination, and the color is at once precipitated onto the tissue sheet in the form of an insoluble compound, which is substantially proof against the further action of water. Likewise the portion of the coloring-matter which is retained by the original sheet is also rendered substantially waterproof and permanent by a similar chemical action. In other words, the paper, both tissue and original sheet, may be said to become permanently dyed by the ink instead of having a mere mechanical connection or union with the paper, as usual heretofore.

The paper may be prepared by being passed through a bath composed of four hundred parts of water to one part of tannic acid, by weight. Sal-soda or any other suitable mordant or combination of mordants in proper proportions may be used, if desired, instead of tannic acid, which latter I have thus far used successfully in practice. After the bath the paper may be properly dried and smoothed, either by passage through heated rolls or otherwise. In practice the copying-tissue may be passed through the mordant bath from a continuous roll and after being dried and smoothed may be cut up into sheets and formed into press copy-books in the ordinary way. The described chemical action will then take place during the press-copying operation, both in the prepared tissue and also in the original sheet. As the mordant will allow only a certain amount of the anilin coloring-matter to be taken up from the original sheet, blurring of the latter and of copy is to a large extent avoided. Hence there may be considerable variation in the degree of dampness of the copying-cloth without injuriously affecting either the copy or the original, which has not been the case heretofore.

Paper may be otherwise subjected to a mordant treatment either during the manufactur-

ing process or subsequently without departing from my invention, and in some cases the paper to receive the original type impressions may be provided with a mordant instead of the press copy-paper, although I prefer that the latter shall be so provided.

It will be observed that my improvements more fully set forth in the concluding claims are equally useful where the original letter or record is written by pen with an anilin ink and subsequently press-copied by the ordinary wet process.

What I claim as new, and desire to secure by Letters Patent, is—

1. The method of preparing paper for obtaining permanent records from anilin or copying inks, which consists in subjecting the paper to the action of a suitable mordant, substantially as described.

2. The method of preparing paper so as to render fast and permanent, against the action of water, copies taken from writings in anilin inks by the ordinary wet process of copying, which consists in applying to the paper a suitable mordant which will chemically combine with the coloring-matter in the ink and cause the same to be precipitated on the paper in the form of an insoluble compound, substantially as described.

3. The method of preparing copying tissue-paper so as to render fast and permanent, against the action of water, copies taken from writings done with anilin inks by the ordinary wet process of copying, which consists in applying to the copying tissue-paper a mordant which, under the action of the moisture used in press-copying, will cause the coloring-matter in the ink to be precipitated in the form of an insoluble compound, substantially as described.

4. The method of obtaining records insoluble in water from writings done with anilin ink, which consists in subjecting the coloring-matter in the ink to the action of a suitable mordant and to the action of moisture so as to cause such coloring-matter to be precipitated upon the paper in the form of an insoluble compound, substantially as described.

5. The method of preparing copying tissue-paper to obtain press copies from anilin ink and to cause said copies to resist the action of water, which consists in applying to or providing the tissue-paper with a suitable ingredient which in the presence of moisture and under pressure will cause the coloring-matter in the ink to be precipitated in the form of an insoluble compound, substantially as described.

6. The method of preparing copying tissue-paper for the purpose described, which consists in passing the same through a mordant bath and subsequently drying and smoothing it, substantially as described.

7. The method of preparing copying tissue-paper to receive press copies from anilin inks

and to retain the same against subsequent obliteration by water, which consists in passing the paper through a mordant bath and subsequently drying and smoothing the paper, substantially as described.

5 8. The method of obtaining permanent ink records upon copying-paper and also upon the original sheet written with anilin ink, which consists in preparing the copying-paper with
10 a suitable mordant and in pressing the original sheet upon the tissue sheet in the presence of moisture and so as to cause the mordant and the coloring-matter in the ink to chemically combine and form an insoluble precipi-
15 tate, substantially as described.

9. The method of fixing copies made with anilin inks against subsequent obliteration by water, which consists in subjecting the coloring-matter in the ink to the action of a suitable mordant, substantially as described.

20 10. As a new article of manufacture, paper containing a suitable mordant adapted to chemically combine with the coloring-matter of anilin inks, substantially as described.

25 11. As a new article of manufacture, copying tissue-paper containing a mordant which is adapted to chemically combine with the col-

oring-matter of anilin inks, substantially as described.

12. As a new article of manufacture, a press 30 copy-book whose leaves contain a suitable mordant adapted to chemically combine with the coloring-matter of anilin inks, substantially as described.

13. The method of preparing paper for ob- 35 taining permanent records from anilin inks which consists in subjecting the paper to the action of tannic acid, substantially as described.

14. As a new article of manufacture, paper containing tannic acid adapted to chemically 40 combine with the coloring-matter of anilin inks, substantially as described.

15. As a new article of manufacture, a press copy-book whose leaves contain tannic acid adapted to chemically combine with the col- 45 oring-matter of anilin inks, substantially as described.

Signed at Bridgeport, in the county of Fairfield and State of Connecticut, this 26th day of September, A. D. 1900.

MURRAY H. CHAPIN.

Witnesses:

L. B. POWE,

T. C. CUMMING.