

How to Distinguish Textile Fibers.

It is customary, says *Textile Industries*, to mix, spin, and weave fibers in various proportions, and as it is important to know the quantities of different fibers contained in goods to be imitated, researches have established a number of tests for this purpose, with which every manufacturer and manager should be thoroughly conversant.

In a fabric composed of linen and cotton, a strong potash solution will color the linen fiber a deep yellow, while the cotton will be only slightly tinged with the color; a mixed yarn or fabric will, therefore, assume a spotted or striped appearance in the liquid. If a sample of the linen to be tested is dipped into olive or rapeseed oil, the fabric will quickly absorb it. When the excess of oil has been removed and the fabric appears striped, it is not pure linen, but mixed, and, further, the linen thread becomes transparent and the cotton thread opaque; while, if the linen saturated with oil is laid upon a dark substance, the linen threads will appear much darker than the cotton on account of this transparency. In order to destroy or dissolve cotton by a process similar to carbonization, the fabric to be tested is laid in a mixture of three parts sulphuric acid and two parts saltpeter for eight or ten minutes, then washed, dried, and, finally, treated with ether containing alcohol. The woolen and linen fibers have remained uninjured, while the cotton has been dissolved.

In order to distinguish animal from vegetable fibers, they may be boiled in caustic potash lye. Both wool and silk will be dissolved thereby, but not linen and cotton. If a sample of woolen goods is to be examined to see if it contains cotton, place it in a concentrated sulphide of sodium solution; by this, the wool is dissolved and can be entirely washed out in hot water. The residue will be vegetable fiber, and, if the sample was at first weighed exactly, the actual percentage of wool can be ascertained by weighing the remaining vegetable fibers. Such a fabric can be analyzed with still greater facility in an undyed condition. Wool and silk, when plunged into picric acid, are dyed a fairly fast yellow, while both linen and cotton remain white.

A silken thread, when exposed to a flame, ignites, evolving a smell of burning feathers, but continues to burn only as long as it remains in contact with the flame, and is extinguished when taken away, the burnt end forming a black, charred substance, thicker than the thread. Wool behaves similarly, but the odor is more repugnant.

The surest and best test, however, is the microscope, which gives unerringly the component fibers of the fabric under examination. For this purpose, several threads must be drawn out of the fabric in question (an operation best performed under water) and subjected to an examination with a power of from 200 to 300 diameters.

The linen fibers appear as cylindrical formations, with nodular swellings, the former sometimes split into thinner fibers, especially in the case of linen which has been used.

Cotton fibers, however, will show themselves as flat ribbons, and are very thin as seen where the edge is shown. With mixtures of linen and cotton, the examination of the fibers can be conducted with still greater facility, by opening a small strip of the material to be investigated, introducing it into a dilute alcoholic solution of aniline red (fuchsine), but only for a very short time, after which it is well washed, and then immersed in caustic ammonia for two hours. In this operation the linen fibers are dyed rose red, while the cotton fibers take no trace of color, and their examination is thereby rendered much more easy.

The fibers of wool appear under the microscope as cylinders covered with scales, and their delicate structure is rendered still more visible by treatment with sulphuric acid, which dissolves the yolk that fastens these scales to the fibers; but the different qualities can also be comparatively tested to ascertain the uniformity, firmness, or strength. The microscope is a means of distinguishing the relative value of the different wools better than is possible by any other mode. For this purpose, a "wool gauge" has been constructed, consisting of a brass frame screwed to the stage of the microscope, into which the wool fiber is fastened in such a manner that it is first loose, but is gradually tightened with a screw for that purpose, when the diameter can be measured with a micrometer and an exact measurement of the fiber obtained. But as all the fibers are not equally thick, it is necessary, of course, to measure several, to obtain the average. To measure the elasticity and strength of the fiber, it is first drawn tight, the index placed upon zero, and the tension increased by the gradual drawing with the screw mentioned until the fiber breaks. The index will show on the scale how many millimeters a fiber may be stretched before it breaks. It is evident that this experiment must be repeated with several fibers, and that the same apparatus can naturally be used for this purpose for all kinds of fibers.

Other animal hair used for textile fibers, goat hair, horse hair, etc., can also be recognized and distinguish-

ed by the microscope. As for silk, it presents no peculiarities, but is simply a homogeneous cylinder without the scale layer, marrow, and bark substance of hair. The optical difference of all these fibers is aided by the micro-chemical investigation. Iodine and sulphuric acid may be used as reagents, whereby the vegetable fibers, consisting of cellulose, are always colored blue, which is not the case with animal fibers. Silk differs from the latter in that it is dissolved in concentrated muriatic acid.

Aluminum for the Preparation of Phosphorus.

The applications of aluminum in the arts multiply with much the same rapidity as do those of electricity. The *Berichte* describes a new method of preparing phosphorus by its use as a reducing agent. The process is so simple that it can easily be illustrated on the lecture table. Hydrogen ammonium sodium phosphate is fused in a porcelain crucible until it is changed into sodium metaphosphate; aluminum turnings are then dropped into the liquid, and the freed phosphorus bursts into flame. Now if the experiment is tried with a glass tube, instead of a crucible, a slow current of dry hydrogen being passed over the mixture of the salt and aluminum, the phosphorus distills into the cooler part of the tube without the formation of any phosphureted hydrogen. The residue consists of alumina, sodium aluminate and a phosphide of alumina— Al^3P^2 .

By these steps in the process only 30 per cent of the phosphorus in the mineral used can be obtained; but the phosphide is decomposed entirely by heating with silica, and this may be added at the beginning of the experiment and the reaction proceeds without difficulty and without loss.

It is advised that for the lecture table a combustion tube a yard long be used; two and a half parts of aluminum, six parts of sodium metaphosphate (obtained from heating previously the hydrogen ammonium sodium phosphate) and two parts of finely pulverized silica are placed in the tube, a slow current of hydrogen is passed through, and heat is applied until the reaction begins. This is shown by sudden incandescence, and phosphorus is seen to condense in globules on the cooler part of the tube, at the end where the hydrogen escapes.

Instead of this phosphate, any ordinary phosphate may be used, but experimenters are warned not to use the superphosphates containing calcium sulphate mixed with them, such as are used for fertilizing purposes, because the sulphate is suddenly decomposed by the aluminum with an explosion when a certain temperature is reached.

Business Law in Daily Use.

Herewith are the most important laws, succinctly stated, that touch the needs of the average business man. An observance of them will enable one to avoid many mistakes that may be serious, and steer the innocent from many pitfalls that may be calamitous. They contain, in few words, the essence of a large amount of legal verbiage not always very intelligible.

Each individual in a partnership is responsible for the whole amount of the debts of the firm, except in cases of "special" partnerships.

Contracts made on Sunday cannot be enforced.

A contract made with a minor is void.

A contract made with a lunatic (or with one who has a general reputation for weak-mindedness) is void. (The latter case must, however, be clearly established.)

The acts of one partner bind all the other partners.

It is a fraud to conceal a fraud.

No consideration is sufficient in law if it be illegal in its nature. (Many "failures" are upset because of this law.)

A receipt for money is not always conclusive.

An agreement without consideration is void.

The law compels no one to do impossibilities. (This must be liberally construed.)

Ignorance of the law excuses no one.

Note especially the following, as affecting the giving and taking of checks and notes:

A note made on Sunday is void.

A note made by a minor is void.

A note obtained by fraud, or from a person in a state of intoxication, cannot be collected. (This is a corollary to the law governing contracts with the weak-minded.)

Notes bear interest only when so stated.

If a note is lost or stolen, it does not release the maker; he must pay it if the consideration for which it was given, and the amount, can be proved.

Signatures made with a lead pencil are good in law.

A note indorsed *in blank* is transferable by delivery, the same as if made payable to bearer.

The maker of an "accommodation" note (one for which he has received no consideration, having lent his name and credit for the accommodation of the holder) is not bound to the person accommodated, but is bound to all other parties, precisely as if there was a good consideration.

If the maker of a check or draft has changed his

residence, the holder must use "due diligence" to find him.

Checks or drafts *must* be presented for payment "without unreasonable delay."

Ignorance or oversight of or willful inattention to these fundamental injunctions is the frequent source of annoying and expensive litigation.—*The Keystone*.

DECISION RELATING TO PATENTS.**MARKING OF PATENTED GOODS.****Supreme Court of the United States.****DUNLAP ET AL. V. SCHOFIELD ET AL.**

Decided March 5, 1894.

Appeal from the Circuit Court of the United States for the Eastern District of Pennsylvania.

This was a bill in equity, filed May 7, 1889, for the infringement of letters patent issued April 2, 1889, for the term of three and a half years, by the United States to Julius Stroheim for a design for rugs.

The plaintiffs asked for an injunction and for damages in the sum of \$250 as penalty and damages under the act of February 4, 1887, chapter 105, and waived all right to any further damages, or to an account of profits. The court, on May 13, 1890, entered a decree for the plaintiffs accordingly, and the defendants appealed to this court.

Mr. Justice Gray (after stating the case) delivered the opinion of the court.

By section 4,900 of the Revised Statutes of United States (which, by virtue of section 4,933, applies to patents for designs), it is made the duty of every patentee or his assigns, and of all persons making or vending any patented article for or under them, to give sufficient notice to the public that it is patented, by putting the word "Patented" upon it, or upon the package inclosing it, "and in any suit for infringement, by the party failing so to mark, no damages shall be recovered by the plaintiff, except on proof that the defendant was duly notified of the infringement, and continued, after such notice, to make, use or vend the article so patented."

The clear meaning of this section is that the patentee or his assignee, if he makes or sells the article patented, cannot recover damages against infringers of the patent, unless he has given notice of his right, either to the whole public by marking his article "Patented" or to the particular defendants by informing them of his patent and of their infringement of it.

One of these two things, marking the articles or notice to the infringers, is made by the statute a prerequisite to the patentee's right to recover damages against them. Each is an affirmative fact, and is something to be done by him. Whether his patented articles have been duly marked or not is a matter peculiarly within his own knowledge; and if they are not duly marked, the statute expressly puts upon him the burden of proving the notice to the infringers, before he can charge them in damages. By the elementary principles of pleading, therefore, the duty of alleging and the burden of proving either of these facts is upon the plaintiff.

In the present case, although the plaintiffs had manufactured and sold goods with the patented design upon them, they made no allegation or proof that the goods were marked as the statute required. They did allege in their bill that they notified the defendants of the patent and of their infringement; but this allegation was distinctly denied in the defendants' answer, and the plaintiffs offered no proof in support of it. They could not, therefore, recover, even if this were a suit for damages within section 4,900 of the Revised Statutes of the United States.

But these plaintiffs, waiving all right to an account of profits, or to other damages, sought and were allowed to recover the fixed sum of \$250, in the nature of a penalty, imposed by the act of February 4, 1887 (ch. 105), upon any person who, during the term of a patent for a design, and without the license of the owner, applies the design secured by the patent, "or any colorable imitation thereof," to any article of manufacture for the purpose of sale, or sells or exposes for sale any article of manufacture to which "such design or colorable imitation" has been applied, "knowing that the same has been so applied." (24 Stat., 387.) This statute, according to its clear intent and effect, requires that, in order to charge either a manufacturer or a seller of articles to which has been applied a patented design, or any colorable imitation thereof, he must have been "knowing that the same has been so applied," which is equivalent to saying "with a knowledge of the patent and of his infringement." The reasons for holding the patentee to allege and prove either such knowledge, or else a notice to the public or to the defendant, from which such knowledge must necessarily be inferred, are even stronger, in a suit for such a penalty, than in a suit to recover ordinary damages only.

In none of the cases on which plaintiffs rely, and by which the court below considered its judgment as controlled, was there any adjudication inconsistent with this conclusion.

Decree reversed and bill dismissed.