Correspondence.

Visibility of Ruled Lines.

To the Editor of the Scientific American:

In an article in your issue of May 5, on "The Visibility of Ruled Lines," there are some statements which do not agree with my experience. I find that lines properly ruled on glass are similar to graven lines; they are smooth, clean cut, having a definite shape and depth. Such lines are always visible in the microscope, and central or oblique light will show the bottom of each cut as a dark or colored line, plainly visible, and requiring no graphite or other foreign substance to indicate it. The microscope is the test for a properly ruled line. The mechanical elements (pressure, etc.) entering into the process of ruling are not at all evidences that lines have been properly ruled. The slightest accident to the point of the cutter, or the surface of the glass not being perfectly clean, will spoil a line; that is, produce a scratch which cannot be satisfactorily illuminated in any light. Well ruled bands of lines, 70,000 or 80,000 to the inch, are visible in the microscope with central light; and with a Smith vertical illuminator (giving central light), I have seen 100,000 lines to the inch. As these individual lines have a width of about $\frac{1}{250000}$ of an inch only, it follows that the difficulty is not to see such a narrow line, but to eliminate the diffractions which tend to blur the image in the microscope, and so prevent the resolution or separation of the lines in a band of them. C. FASOLDT.

DECISIONS RELATING TO PATENTS, TRADE MARKS, ETC.

Supreme Court of the United States.

THE MANHATTAN MEDICINE COMPANY, APPELLANT, *vs.* WOOD *et al.*

Mr. Justice Field delivered the opinion of the Court.

A court of equity will extend no aid to sustain a claim to a trade mark on an article which is put forth with a misrepresentation to the public as to the manufacture of the article and as to its place of manufacture, both of which circumstances were originally circumstances to guide the purchaser of the medicine.

When a right to the use of a trade mark is transferred to others, the fact of transfer should be stated in connection with its use, otherwise a deception would be practiced upon the public.

Appeal from the Circuit Court of the United States for the District of Maine.

United States Circuit Court.—District of Rhode Island.

COUPE *et al. vs.* WEATHERHEAD *et al.*

Lowell, J.:

This bill is brought upon Letters Patent No. 213,323, granted the plaintiff Coupé, March 18, 1879. It describes a mode of stretching and reducing to a uniform thickness what is known in the trade as "rawhide leather;" that is, a hide which has been stripped of its hair and has been softened and brought to a state in which it is very soft and flabby and much wrinkled, but has not been tanned.

Held by the Court:

If, in the operation of a prior machine, a greater number of persons necessarily have to be employed than in a patented machine, this tends to prove that the machines are not alike.

The omission of certain elements of the old machine and insertion of certain additional features, if an improvement results, constitute a patentable invention.

Infringement of a claim is not escaped by the employment in a combination of a certain board, which only effects two-thirds of a desired result, it depending altogether on the thickness and stability of the board whether the whole operation is or is not copied.

It is not necessary for a machine to be automatic in order to be patentable.

Tin Cans and Foods.

Stamping machines first receive the tin, each machine cutting out one of the four pieces used in making the can. The first cuts the tin plate into plain, rectangular strips. These are for the cylinder of the can, which is made of a single piece. The second stamps out a round piece, forming the bottom of the can. The edge of this is turned over by the machine and a single stamp cuts it, turns the edge, and produces the bottom ready to be fitted on to the cylinder when that shall be made. The third produces the top. This is also round, of the same size as the bottom, with a hole in the middle on which the cap will be fitted later. This, with the turned edge and the groove around the hole for the cap, is also produced by a single stamp of its machine. The fourth machine turns out the cap. Each piece is then carefully examined for flaws or breaks. All defective ones are thrown aside.

The rectangular strips pass to the hands of a workman, who bends them, one by one, over a cylinder of the exact size of the can that is to be made. One end of the strip then laps over the other, perhaps a quarter of an inch. With a treadle he loosens a spring, which brings a clamp down on the upper edge and holds the tin ready for the solder. With a quick motion he throws a little powdered rosin and a small lump of solder upon the edge exposed, and then passes a soldering iron over it. By the time he has repeated these operations on another cylinder, precisely similar, with another strip of tin, the solder on the first one is cool enough to hold the edges together, and the hollow cylinder is taken off. It may be mentioned that the solder is all previously cut by machinery into lumps of the exact size necessary to solder the seam properly. This seam—the one up and down the body of the can—is soldered on the outside, in hand-made as well as machine-made cans.

The next workman has before him three piles. One is of the body of the can, so called, or the hollow cylinder, made as just described. In the other piles before him respectively are the bottoms and heads from the stamping machines. There is also a sponge, wet with one part of muriatic acid, in which zinc has been dissolved, and three parts of water, and there is a large dish full of powdered rosin. Taking a cylinder or body in one hand, he presses one end of it upon the sponge, wetting it with the diluted acid, and then thrusts it into the powdered rosin. Enough rosin adheres to make the necessary "flux" for the solder that is presently to be put there. Then taking a bottom in the other hand, he puts it on the end prepared.

The can is then ready for the machine that is to do the "outside soldering," which distinguishes it from the hand-made can. This machine is very simple and is run by a boy. By its means the can is made to revolve five or six times, with its lower edge in a bath of solder kept fluid at the proper temperature, the superfluous solder being scraped off at the same time. The top and bottom are soldered on in this way. The can is then filled. The filled cans are each placed on a small revolving table, a clamp holding them in position. Then, as they revolve, the boy touches the edge of each cap with a brush wet with dilute muriate of zinc.

As has been said, the top of the can is made with a hole, around which a groove is stamped. The cap is simply a round piece of tin with the edge turned down to fit into this groove, and with a small vent hole punched in it near the middle. All the parts being made by machinery, the edge of the cap fits into the groove with exactness, and it is supposed that, practically, none of the acid or of the solder reaches the inside of the can, but all remains in the groove on the outside. The solderer now applies a semicircular soldering iron kept at a great heat, and a stick of solder. The iron fits into one-half of the groove, and as the can revolves the whole edge of the cap is soldered on. The heat of this operation expands the contents of the can, which was as nearly full as practicable before being sealed, so that the last particle of air is supposed to be driven out through the vent hole. This vent hole is then closed with solder by the next workman, and the process of closing the can is complete. In dealing with meats and some kinds of vegetables it has been found necessary to revent them, or, in other words, to reopen the vent hole later on and solder it up again. Why this has to be done with some materials and not with others is not known; but experience has taught the canners that it must be done with some goods or else they will spoil.

The can is now sealed, but it is by no means ready for the market. If the goods were sent out at this stage, few of them would hold together, and all would spoil. The danger—the certainty—of putrefaction has yet to be guarded against. This is done by cooking the food inside. The packers call it "processing." Enormous kettles are arranged, into which crates or frames, holding sometimes a thousand cans, are lowered. A lid is then screwed on and steam is let in. The amount of heat to be used and the length of time the food must cook vary, of course, with different articles, and the skill of the superintendent is called in especially at this point. He must know, and does know, what degree of heat to apply, and how long to apply it. It is his secret. After the processing (and, as said, in some cases the reventing) the goods are ready to be labeled and sold.

The process above described relates to machine-made cans. The difference between these cans and the hand-made ones is this: The food does not come in contact with the cans above described, but the reverse is the case in the hand-made cans. The making of the cylinder of the can is the same in both cases; that is, the seam from bottom to top of a cylindrical can is always soldered on the outside. The top is then put on and a lump of solder is dropped in, together with some powdered rosin. With a hand soldering iron the workman then melts and places the solder. The can is then reversed, the bottom put on, and a lump of solder and the rosin are thrown in through the opening in the top, through which the packing is to be done. The soldering iron is then put through the same opening and the bottom is fastened by the same ordinary soldering process.

In the manufacture of tin cans, six substances or materials are used which come in contact with the foods which are packed in them—namely, tin, iron, rosin, lead, zinc, and muriatic acid. The tin plate, or, more properly, tinned plate, is made by dipping sheet iron plates into a bath of molten tin, the tin adhering in sufficient quantity to form a perfect coating on the iron. A surface of pure tin is thus presented by the cans made from this tin plate. The solder is tin and lead melted together, and the rosin and muriatic acid form a flux for the solder.

If all these materials are pure and rightly used, the danger of any evil effects from the foods coming in contact with them is very slight. Charges have been made that the canners (or some of them) use an inferior quality of plate, coated with an alloy of tin and lead called "terne." It is said, even by those in the trade, that some five or six years ago a quantity of this was used in the canning of food; but it is tolerably certain that none is used now. The danger of using it is admitted by all canners. "Terne" is used principally for roofing, and it is safe to say that none of it is used to make cans for holding "canned goods." It is used, however, to a considerable extent for making cans in which spices, tobacco, etc., are packed.

Some makers deny that any solder is to be found inside their cans, or that any "flux," excepting rosin, is used. In this case, and supposing the tin plate to be of good quality, that is, sufficiently coated with tin, the food could only be touched by tin or rosin. As a matter of fact, this statement is never mathematically true, since even in the most carefully and scientifically constructed can the vent hole is stopped with pure solder, that is, tin and lead. On the other hand, supposing a defect in the tinned plate, the food might touch iron. It certainly would touch tin. In case of an "inside soldered" can it would touch lead. And there is always an apparent possibility of a certain amount of the flux—rosin, muriatic acid, or zinc—coming in contact with food.

The dealers say that more of the hand-made cans are used than those manufactured by machinery, as the soldering done by hand on the inside makes a stronger can, and the loss is less on account of there not being so much danger of air entering. The smallest imaginable hole in a can will admit the air, and the packed goods will be ruined. The packers and members of the trade do not believe that there is any danger of poisoning in the cans, and say that the proportion of lead and acids is altogether too small. The *Manufacturers' Gazette*, from which we take the foregoing, remarks: "Certainly, if there were any trouble, we should hear more frequent complaints than we now do, and we must conclude that the tin cans in common use are, to all intents and purposes, harmless."

Modern Guns and Projectiles.

The U. S. Board of Engineers for Fortifications has recently submitted a valuable report upon the practice in Europe with the heavy Armstrong, Woolwich, and Krupp rifled guns. The conclusions of this report are as follows:

"Experimental firings for penetration during the past twenty years have determined:

"1st. That wrought iron and cast iron, unless chilled, are unsuitable for projectiles to be used against iron armor; that the best material for that purpose is hammered steel or Whitworth's compressed steel.

"2d. That cast iron and cast steel armor plates will break up under the impact of the heaviest projectiles now in service unless made so thick as to exclude their use in ship protection.

"3d. That wrought iron plates have been so perfected that they do not break up, but are penetrated by displacement or crowding aside of the material in the path of the shot, the rate of penetration bearing an approximately determined ratio to the striking energy of the projectile, measured per inch of shot's circumference, as expressed by the following formula:

$$\text{Penetration} = 2{\cdot}035\sqrt{\frac{V^2 P}{2g \times 2r\pi \times 2240 \times 0{\cdot}86}} \text{ in inches.}$$

V = velocity in feet per second; P = weight of shot in pounds; r = radius of shot in inches.

"That such plates can, therefore, be safely used in ship construction, their thickness being determined by the limit of flotation and the protection needed.

"4th. That though experiments with wrought iron plates faced with steel have not been sufficiently extended to determine the best combination of these two materials, we may nevertheless assume that they give a resistance about one-fourth greater than those of homogeneous iron.

"5th. That hammered steel in the late Spezia trials proved superior to any other material hitherto tested for armor plates. The 19 inch plate resisted penetration and was only partially broken up by four shots, three of which had a striking energy of between 33,000 and 34,000 foot tons each. Not one shot penetrated the plate. Those of chilled iron were broken up, and the steel projectile, though of excellent quality, was set up to about two-thirds of its length. This experiment seems to promise the solution of the problem to determine a material for armor plates which, though limited in thickness to the carrying capacity of the ship to be protected, will still have sufficient resistance to break up the projectiles of the largest guns now in the naval service, without being penetrated or broken by the projectile.

"It seems probable that a hammered steel plate, like that tried at Spezia, if equal in thickness to the belt armor of the Inflexible (22 inches), would stop the shot of the 100 ton gun (Armstrong) fired with its greatest practicable velocity.

"Finally, these later experiments confirm this Board in its opinion, enunciated some years since, that, while the 12 inch rifled gun may prove a sufficient armament for the barbette batteries of our sea coast defenses, as against the lighter ironclads of foreign navies, iron turrets, armed with guns of 100 tons weight at least, will be needed to meet the attack of armored ships of the latest construction."

The 100 ton chambered Armstrong gun, throwing a projectile of a ton weight, and fired with a charge of over 700 pounds of powder, may be taken as a sample of the monstrous requirements of modern war. Such guns must be both made and operated by machinery.

Corn and Wart Cure.

Gezou's remedy for corns and warts is prepared as fol lows:

℞. Acid. salicylic .... gr. xxx.
Ext. cannabis indic .... gr. x.
Collodion .... ℥ ss. M.