

care they get, it is little to be wondered at, that it is an exception to find one of them delivering dry steam.

Any boiler has a limit of steam generation, beyond which it cannot be pushed without priming; and, on the other hand, any boiler has a limit of steam producing capacity, below which it will deliver perfectly dry steam. The amount of dry steam per pound of fuel actually burned, that boilers will produce, from water at 212° Fah., is the accepted standard of comparison as to their working economy. Experiments made by myself have, however, shown that in very few cases, where boilers are thus tested, absolutely dry steam is delivered; the amount of water contained in the steam being in one case, which I now call to mind, certainly not less than forty per cent of the entire weight of mixed steam and water issuing from the boiler. This was, of course, an extreme case, in which the boiler was specially contrived, it would seem, to prime as much as possible. The evaporative power claimed for it by its sanguine inventor, was thirteen pounds of water per pound of coal consumed. All the way from this extreme, up to absolutely dry steam, you may find boilers working, if you will look for them. Boilers priming to the extent named, or even much less than that, are really unfit for service to supply engines with steam; and, I need not say, are scarcely ever used for that purpose. But boilers often prime to a much greater extent than is suspected, in the absence of means to detect the exact amount of water mechanically carried over.

A common method of testing the quality of steam is to pass the hand through the jet of steam escaping; a method so rude, that it is really a disgrace to the science, which has taught us, that, with steam as a motor everything may be reduced to mathematical certainty. I have known the estimate made by good judges to be ten per cent from the truth, in making this test. The appearance and feeling of steam, differ with the hygrometric condition of the atmosphere into which it rushes. On a clear bright day, steam appears different from the same quality educted on a moist, foggy, and obscure day.

The method I have employed for testing the quality of steam, and the instrument devised for the purpose, is based upon the fact that steam at 212° always contains 1,178 heat units per pound, and water at 212°, 212 units of heat per pound. It follows that, knowing the amount of heat issuing from a boiler in a pound of mixed steam and water, the proportions of water and steam, in the pound, can be easily determined. For if x be used to represent the water in pounds, and y the steam in pounds, a the quantity of mixed water and steam educted, in pounds, and b the total number of units of heat carried out in the mixed water and steam, we may form the equations

$$\begin{aligned} x + y &= a \\ 212x + 1178y &= b \end{aligned}$$

from which we find the value of x to be $x = \frac{1178a - b}{966}$; or,

to drop algebraic language, the amount of water contained in a given amount of mixed steam and water, will be, in pounds, 1,178 times the weight of mixed steam and water, minus the number of units of heat it contains, divided by 966, the number of units of heat required to convert a pound of water at 212° Fah. into steam at the same temperature.

To determine the amount of heat carried out by the mixed steam and water, I devised the following apparatus. A scale beam with a platform, and a thickly felted water chamber at one end, and a counterpoise at the other, has upon it a sliding weight, indicating pounds and half pounds. The walls of the water chamber are made of thin tinned sheet copper; there being two shells, between which, felting, an inch and one half thick, is placed. A felted cover is also provided, through which is inserted a standard thermometer, having a large bulb and easily read in fifths of degrees. A finely perforated coiled copper-pipe rests upon the inner floor, and passes out at the lower part of the side wall of the chamber. This is the steam induction pipe. The bottom of the chamber is obtusely funnel shaped; and, from the lower part of the funnel, is led out an escape pipe. Both pipes are provided with cocks. A small funnel in the cover, also provided with a cock, completes the apparatus.

To use it, five pounds of water are placed in the chamber, through the funnel in the cover. The water is then raised to 80° Fah. by allowing a jet of steam—conveyed through a felted pipe—to enter through the coiled induction pipe. The surplus water thus added is drawn off through the escape pipe at the bottom of the chamber, leaving in the chamber five pounds of water at 80°, containing 400 units of heat. The sliding weight is then set along into the five and one half pound notch, and the steam to be tested is then allowed to flow in till the scale beam balances. Then the influx of steam is stopped, the thermometer is read, and the experiment is complete.

Suppose, now, the resulting thermometrical reading to be 180°. We then have 960 units of heat in the chamber, not counting in the amount absorbed by the thin copper lining—a very small amount indeed, and only noticeable theoretically; the general result is scarcely affected by its neglect. It follows that the amount of heat conveyed into the chamber in the pound of mixed steam and water is 960—400=560 heat units. Substituting this value for b in the above formula, we have (the value of a now being $\frac{1}{2}$) $\frac{1178 - 560}{966 \times \frac{1}{2}}$ which, reduced to hundredths, gives $31 \frac{908}{1032}$ per cent of water.

This instrument, for want of a better term, I have called the "steam hygrometer."

The standard quantity of water in the chamber, five pounds, the standard temperature, 80°, and the standard quantity of steam admitted in the experiment, one half pound, are chosen merely as matters of convenience. It is evident that, for

any system of standards, the percentages for different resulting temperatures, between the minimum and maximum limits inclusive, may be computed and tabulated, so that, in testing boilers, no calculation need be made; the percentage for any resulting temperature being taken at once from the table.

REFUSE AND WASTE.

There are no such things as waste products in Nature's laboratory, but in man's workshop there are plenty of them. In fact, we make little use of the gifts that are bestowed upon us, a vast majority of them being wasted on account of our ignorance of their value.

If there be anything that characterizes the present age, it is the revolution that has taken place in this respect. We live in the era of saving, and many are the objects now turned to good account which formerly were thrown away. But, notwithstanding the boasted progress of this century, we cast away far too many substances under the names of refuse and waste.

In the cutting, sawing, and paring of cork wood, there is an accumulation of light material, which is used for packing, filling life preservers, and manufacture of mattresses. This refuse, if burned, would produce a smoke that might prove of value in preserving meat and fish; if distilled, it would yield peculiar products; and, if chemically treated, would furnish corkic acid, the properties of which are not well understood. The charred cork has long been used for its fine black color, and it is possible that, for disinfecting and filtering purposes, it is capable of application. Here is quite a field of research for any one who has the knowledge and leisure.

What becomes of the buttermilk, after the fatty matter is separated from it? We know that it is extensively fed to the pigs, and not a few people eat and drink it. It has peculiar chemical properties, and is said to work up into cements. Could we not, also, by blowing air through the milk, as well as agitating it, add to the yield of butter, and otherwise modify the character of the sour curd? The fermentation of the buttermilk is not understood by our farmers, nor do they pay much attention to other possible uses of this refuse. As there are enormous quantities of milk used in butter making, it would be well to look into this matter.

So, too, in the cheese industry; in Europe they save the whey to convert it into milk sugar, and this article of sugar can be fermented, and used for many purposes. In homeopathy it already plays an important part.

The root plants growing wild all over our country ought to be examined and experimented upon by agriculturists. We have abundant encouragement in favor of such a course, in the history of the tobacco, potato, sugar beet, peppermint, spearmint, wintergreen, and a host of other natural products that, by judicious culture, have been raised from the rank of weeds to a first class position among profitable crops. The sugar beet especially is worthy of note; it was originally an unsightly plant growing wild in Southern Europe. By culture it has been improved and changed in character, and now yields nearly one third of the total sugar crop of the world, and represents an industry worth some hundreds of millions of dollars. As the Government of the United States has set aside large tracts of land to endow agricultural colleges, it is not asking too much for some of these institutions to cause experiments to be made upon what are now called weeds. Many of these wild plants contain alkaloids, sugar, tannic acid, and fiber for paper, and could, by culture, be converted into valuable products. The example of the Massachusetts Agricultural College in this direction is well worthy of imitation.

Sawdust, which was formerly thrown away, is now converted to many useful purposes. The manufacture of oxalic and formic acids from it, is extensively prosecuted in England, and is the source of wealth to all who are engaged in the business; but that is not the only invention that has been sought out with this unpromising material. The hard boxwood sawdust makes an excellent polish for jewelry, and mahogany sawdust is good for smoking fish. Westphalia hams owe their admirable flavor to the wood used in preparing them. Sawdust from the birch cleanses furs; that of sandal wood, cedar, butternut, and black walnut, affords volatile oils that find favor as perfumes or to destroy insects. They have a way in France of compressing sawdust into molds suitable for use as artificial wood; and it could also be distilled for the production of creosote, acetic acid, and wood gas. Some of it could be used for paper, but in general the fiber is too short. A new industry has arisen in converting the sawdust into gun cotton for the use of photographers, and in the manufacture of a coarse blasting powder. It will thus be seen that sawdust is hardly any longer to be considered a waste product, but it is a great help in many industries.

Vulcanized rubber was long an object of study and experiment, to see what uses could be made of the waste; after the sulphur had been added, it was thought that it could not be worked over, and in this event, the price was likely to remain at a high quotation for many years. Fortunately, the difficulty yielded to the stubborn will of our manufacturers who do not like to throw anything away, and a process was discovered by which the old rubber could be mixed with the fresh in certain proportions, and thus changed to a useful article. Ivory dust and shavings have found favor in the manufacture of steel plates, and as an article of food. Iron filings, tin scraps, refuse from galvanized iron, furnace slags, photographer's slops, chimney soot, dead oil, rags, galls, bones, fat, brine, oil from wool, cold dust, cotton seed, sponge, sea weed, leather scraps, and a host of other things that were useless in former times, are now economized to a considerable extent.

There is a waste in large cities for which there is really no necessity, and that is of the sewage. A vast amount of valuable phosphate goes to feed the fish off the banks of Newfoundland; and if we had the monopoly of the fish, there would be some recompense; as the case now stands, we have the consolation of knowing that we feed the fish for other people to catch: and then as a sort of compensation, we send to the islands of the Pacific for guano with which to enrich our lands. There is enough compost annually thrown away to increase the value of our crops many million of dollars. The vastness of this waste has probably deterred our engineers from attempting to grapple with it, but that is no reason why the loss should go on forever.

We have thus presented some considerations on the topic of refuse and waste, which may awaken inquiry in the minds of inventors, and lead to practical results.

MAGGOTS IN THE EAR.—Dr. C. Robertson of Albany, N. Y. at a meeting of the Albany County Medical Society, spoke of the case of a lady, who, while on a picnic, heard a fly buzzing about her ears, but did not think of the circumstance again until after the lapse of a few days, when she felt some irritation in one ear. A physician removed some parasites with aural forceps, which had penetrated beyond the membrana tympani. Sweet oil was poured into the ear, and retained for awhile; shortly, a maggot came to the surface, apparently in search of breath; this gave relief for ten minutes. More were observed, which were extracted with the forceps. The after-treatment consisted in syringing the ear with warm water. The opening in the tympanum closed, and her hearing became perfect.

No person should allow a tooth to be extracted till every possible means have been tried to save it.

NATURE—"the garment of God, by which thou seest Him."—GOETHE.

THE man who possesses good health is always rich.

IMPORTANT DECISION OF THE COMMISSIONER OF PATENTS—TRADE MARK PATENTS.

In the matter of the application of Porter Blanchard & Sons, for the Registration of a Trade Mark for Churns.—The applicant seeks to have registered as a trade mark the words, "The Blanchard Churn," to be stencilled on the churn they manufacture and sell.

The examiner refused the application, and gave as a reason for the refusal, "The label of applicant is not sufficient to entitle it to registry as a trade mark; the words should be accompanied by some sign or mark to distinguish the same from the mere words alone, to the use of which, latter, other possible parties of the name in like business might have an equal right."

Section 79 of the Act, approved July 8, 1870, in the second clause provides that "The Commissioner of Patents shall not receive and record any proposed trade mark which is not, and cannot, become a lawful trade mark, or which is merely the name of a person, firm, or corporation only, unaccompanied by a mark sufficient to distinguish it from the same name when used by other persons," etc.

The question, what constitutes a lawful trade mark, is left by the statute just where the common law leaves it, with the single limitation, that it shall not be the mere name of a person, firm, or corporation, unaccompanied by a mark sufficient to distinguish it from the same name when used by other persons.

The only thing about this limitation that is at all ambiguous, is the meaning of the word "mark." The examiner seems to understand by this word some device, figure, or emblem, something other than mere words. In this interpretation of the word "mark," I am clearly of the opinion that the examiner is wrong.

Every man in the United States who is engaged in trade or manufacturing, is entitled to the registry of a trade mark if he chooses to adopt one; and to require each person to invent a device or symbol, differing from all others in the same trade, would be to require an impossibility, and Congress certainly never thought of attaching such a meaning to the word "mark." This word had obtained a technical meaning before the act of July 8, 1870. The term "trade mark" was in very general use, and by such use, and by the constructions and rulings of courts, was made to include, not only devices and emblems and symbols, but single words, and all manner of combinations of words without devices. Congress took this word "mark," with the meaning it had obtained in the compound word "trade mark," and introduced it into the statute.

Previous to the passage of this law, the courts had not been uniform in their decisions as to the mere names of persons, firms, or corporations being legal trade marks, and the statute settled this question by saying that the mere name of a person, firm, or corporation only, unaccompanied by some other "mark" that is, some other word, or words, or letter, or figure, or sign, or symbol, or device—in short, something in addition to the mere name only—should not be registered as a trade mark.

I am clearly of the opinion that any word or any combination of words, with the single exception named, that would constitute a trade mark under the common law, may be registered as such under the statute of July 8, 1870. The expression, "The Blanchard Churn," certainly is not the mere name of a person only, but the name is accompanied by the words "The" and "Churn," hence it is not excluded by the limiting clause of the statute. The only question then is, as to whether it is a legal trade mark at common law.

In the case of The Amoskeag Manufacturing Company, 2 Sand. S. C. R., 599, the Court says: "Every manufacturer and every merchant for whom goods are manufactured, has an unquestionable right to distinguish the goods that he manufactures or sells, by a peculiar mark or device, in order that they may be known as his, in the market for which he intends them, that he may thus secure the profits, that their superior repute as his, may be the means of gaining."

"The principle is well settled, that a manufacturer may, by priority of appropriation of names, letters, marks, or symbols of any kind to distinguish his manufactures, acquire a property therein as a trade mark." Stokes vs. Landgraf, 17 Barb. 638.

"A manufacturer of goods who, in order to designate his own manufacture, has adopted names, marks, or labels, which are peculiar, and not before used, is entitled to be protected in a court of equity in their use." Williams vs. Johnson, 2 Bosworth 6.

"Though the mark has no other meaning than to distinguish their manufacture from others, if the party has given it out as his mark, and by it the article has acquired reputation and sale, he is entitled to protection in it."—Ibid 6.

"Any contrivance, design, device, name, or symbol which points out the true source and origin of the goods to which it is applied, or which designates the dealer's place of business, may be employed as a trade mark, and the right to its exclusive use will be protected by the Courts." Filley vs. Fessenden et al. Supreme Court of Missouri, Vol. 3, U. S. Am. Law Reg., 402.

"The books are full of authority establishing the proposition that any device, name, symbol, or other thing may be employed as a trade mark which is adapted to accomplish the object proposed by it; that is, to point out the true source and origin of the goods to which said mark is applied."—Ibid 6.

These quotations state the broad doctrine on the subject of trade marks as held by the courts.

The following are a few among many trade marks that have been sustained by the Courts, and that would not be excluded by the limiting clause of the law of July 8, 1870, namely: "Cocaine," as the name of hair oil, Burnett vs. Phalon, 9 Bosworth, 192; "383" as a mark for pens, Gillott vs. Esterbrook, 47 Barb. 545; "Sykes' Patent" as a mark for shot bolts, Sykes vs. Sykes, 5 Barn G. Cross, 519; "Bell's Life" as the name of a newspaper, Clemens vs. Masick, 22 Law Rep. 428; "H. H. 8," as a work on blows, Remsen vs. Bentall, 3 Law of U. S., 161; "Roger Williams Long Cloth," Burrows vs. Knight, 6 R. I. 434; "Anatolia" as a brand for liquorice, McAndrews vs. Bassett, 10 Jurat, N. S. 550; "Revere House" as the name of a hotel, Marsh vs. Billings, 7 Cush. 322; "Burgess' Essence of Anchovies," Burgess vs. Burgess, 17 Eng. Law and Eq. R., 257; Morrison's Universal Medicines," Morrison vs. Salmon, 2 Man and Grau., 35.

It is proper here to remark that most of the trade marks here referred to were used in connection with the names of the persons claiming them, or with their place of business, or both, and sometimes in connection with other words.

There seems, then, to be no more restriction against the choice of words, combinations of words or names (other than the mere name of a person, firm or corporation only), for a trade mark, than of symbols or devices. The only limitation at common law in the selection of words or devices for trade marks is, that they be so far original, as, when known in the market, to distinguish the goods of one merchant or manufacturer from those of another, and that they be not generic in their use, nor a description of quality nor calculated to deceive the public as to their true origin or ownership.

The object of a trade mark is to point out the origin and ownership of the article offered for sale, and clearly the words "The" and "Churn" selected do this, the less objection there should be to their selection and registration and trade marks, so they avoid the limitations named.

The combination of the three words, "The Blanchard Churn," seems to possess the necessary characteristics of a trademark, and is not excluded by the limitations. The decision of the examiner is therefore reversed.

(Signed) M. D. LEGGETT, Commissioner.

April 24, 1871.