

in solid water, unaffected by stern post, rudder, and the overhanging part of the stern, as in ships of the usual form.

A vessel of this form will not roll and pitch as much as other vessels, as the body of water above the projecting part of the hull offers considerable resistance to such motions.

The rudders may be nearly balanced, and will require but little power to work them, and on account of the peculiar form of the stern, the rudders may have considerably less area than those of the common model, as it requires less power to move the stern laterally.

The form of the hull, while permitting very sharp entrance and run, affords ample room for the application of the greatest engine power compatible with carrying capacity. Two propellers, acting entirely independent of each other, will increase security against accidents to the machinery at sea, and the same may be said of the two rudders, which, although designed to be worked together by the same steering apparatus, may in case of necessity be worked separately.

The increasing width of the hull below as well as above the load water line gives great steadiness to the ship, so that it may be moved about even without load or ballast. This is owing to the fact that the metacenter rises with increased beam much more rapidly than the center of gravity.

The merits of this system are likely soon to be brought to a practical test, and it would be no surprise to those who have given the subject a careful investigation, if the efficiency of the system should prove greater than is indicated by the figures given.

Dangers of Phosphorus.

A series of investigations that have been published in several numbers of a German match journal has led to the following general conclusions:

- 1. The manufacture of matches from white phosphorus, owing to the unavoidable evolution of phosphorus vapors, is fraught with the gravest danger to the health and lives of the workmen.
2. The vapors of phosphorus, if breathed for a long time, produce general ill-health, under circumstances not yet fully understood, but which are probably to be sought for in the idiosyncrasies of the individual.
3. The necrosis of the jaw, if not relieved in time by an operation, results in death.
4. The injurious constituents of the phosphorous vapors are neither phosphorous acid nor phosphoric acid, but phosphorus itself, free and uncombined, which passes into the blood as such, and probably circulates in the blood in the form of vapor, and from the blood acts upon special organs (liver, kidney, heart, stomach, and muscles) as well as on the bone tissues.
5. The most dangerous operations in making matches are making up the paste, dipping the splints, drying and packing the matches.
6. The manufacture of matches should only be permitted under the conditions that the phosphorous vapors shall be completely excluded from the work-rooms
7. These conditions can be sufficiently complied with by energetic ventilation, and the use of a safety apparatus like those constructed by Beck & Henkel in Cassel.
8. The absolute prohibition of the manufacture of matches from white phosphorus does not seem necessary from the sanitary police point of view.

Dr. Hahn, in a communication to the Chemiker Zeitung, makes the following comments to these conclusions: All the objections that have been made to the use of white phosphorus would deserve the fullest consideration if it was possible as yet to make cheap and easily inflammable matches without phosphorus. This, however, is not the case. Matches made of chlorate of potash, bichromate of potash, sulphur, and glue or gum, ignite only on a prepared surface covered with red phosphorus, gray antimony, pyrites, black oxide of manganese, and glass. The so-called "Swedish matches" fulfill the hygienic conditions of freedom from danger in manufacture perfectly, and are only in a slight degree explosive. In their manufacture the wood of the aspen tree must be used, and as this is very scarce in Germany, or has to be imported from Russia, they are about twice as expensive as the ordinary matches made of pine splints and hence have not found much favor among the people there.

But all inflammable mixtures made without the use of red phosphorus have the disadvantage of being uncertain, or difficult to ignite, and although theoreticians and some manufacturers that are trying to introduce such matches consider them a grand success, the public in general look on them as a grand failure.

Matches should, of course, never be made at home, where in addition to poor ventilation, the work-room must often serve as eating and sleeping room as well.

An anvil cast in Pittsburg is supposed to be the heaviest casting made in this country. It is said 160 tons of iron was melted to pour it.

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A DUBIOUS AMENDMENT OF THE COPYRIGHT LAW.

At its last session Congress passed an act (approved August 1), which provides "That manufacturers of designs for moulded decorative articles, tiles, plaques, or articles of pottery or metal subject to copyright, may put the copyright mark prescribed by section forty-nine hundred and sixty-two of the Revised Statutes, and acts additional thereto, upon the back or bottom of such articles, or in such other place upon them as it has heretofore been usual for manufacturers of such articles to employ for the placing of manufacturers', merchants', and trade marks thereon."

This act is a model of ambiguity. The only thing certain about it is that it gives permission to put the copyright mark on the back or bottom of articles "subject to copyright." By implication it includes among articles subject to copyright moulded decorative articles, or designs therefor, hitherto protected only by design patents; but it does not say that such articles may now be copyrighted.

The purpose of the author of the bill was evidently to bring under the action of the laws of copyright a class of purely decorative objects not already subject to copyright, since they are not "models or designs intended to be perfected as works of the fine arts;" but the bill as draughted signally fails to do so.

The Librarian of Congress accordingly refuses to allow the registration of such purely decorative articles, for which no specific provision is made in this or previous statutes relating to copyrights, leaving them to be protected as heretofore by the law for design patents.

We are informed that the bill as enacted was introduced in the Senate by the patent committee, which properly had nothing to do with the subject; that neither the proper committee nor the Librarian of Congress ever heard of the bill until it was passed; and that the House acted upon it without due consideration and without referring it to the proper committee.

Thus it would appear that the manner in which the bill was passed was as loose as its grammatical and logical construction. As a law it is unintelligible, and only adds confusion to what was sufficiently confusing before.

NEW ANTISEPTICS FOR SURGICAL USE.

Certain inconveniences and disadvantages attending the use of carbolic acid spray in dressing wounds have led to a general search for acceptable substitutes. One of the most promising is the use of substances which are volatile as well as of antiseptic nature, such as eucalyptol, cajeput, terebene, and peppermint, by means of which a wound may be kept, if necessary, in an antiseptic atmosphere not merely while being dressed but at all times.

At the late annual meeting of the British Medical Association Mr. A. W. Mayo Robson described a series of experiments made by him to test the efficiency of atmospheres charged with such volatile antiseptics in preventing the development of life in putrescible fluids, the results being exceedingly encouraging. Flasks of sterilized hay infusion suspended in large, wide-mouthed, open jars, into which a little eucalyptus oil, cajeput oil, or the like, had been poured, remained clear, while flasks of the same infusion briefly exposed to ordinary air and then covered with cotton wool began to lose clearness and to scum over within a few hours. Altogether the results were thought to indicate that at ordinary temperatures air saturated with vapors of the class named was fatal to the germs of bacteria and micrococci, and probably also to the germs of fevers and other infectious diseases. As the vapors tested are not unpleasant or injurious when breathed, it is to be hoped that practical tests in hospital wards will confirm the promise of Mr. Robson's experiments. As eucalyptol—derived from the common eucalyptus—is abundant and cheap, it has been selected for further tests. Several surgeons have taken part in these tests, and the results are decidedly encouraging. When the vapor is used during surgical operations a bellows is employed to discharge air charged with it upon the spot exposed. The air is first drawn through a vessel filled with cotton wool, then through others filled with pumice stone over which a small quantity of eucalyptol has been poured. The emerging air is thus loaded with invisible particles of the antiseptic, which seems to be capable of destroying any vestiges of germ-life which may have been drawn in from the surrounding atmosphere. This is a pleasanter method than Lister's or the boroglyceride treatment of Professor Barff.

Not less promising is the turf-mould dressing of Dr. Neuber, of Kiel, the result of investigations of the antiseptic qualities of turf-mould made by him during the past two years. The fibrous and friable character of turf, and its lightness, softness, and elasticity, make this substance much neater and more comfortable than "dry earth" as a surgical dressing; and it seems also to have much greater antiseptic power. The mould, reduced to powder, is inclosed in bags of carbolized gauze, and simply bound upon the wound, which has previously been washed with a carbolic or other antiseptic lotion. This dressing has been used by Professor Esmarch in fifty-five cases, most of them severe operations, with wonderfully good results. In thirty-one cases there was no fever, and in only five cases was it necessary to remove the dressing, owing to either local or general disturbance. The chief advantages claimed for this dressing are its great absorbent power, its tendency to prevent the formation of putrefactive products; the easy adaptability of the turf pads to the surfaces of the body and limbs; and its cheapness, the cost being about one-ninth that of the Lister-

ian dressings. For use in public hospitals and in private practice among the poor, the element of economy is a very important one.

Another great advantage, if the apparent virtues of turf mould are confirmed by wide experience, will arise from the circumstance that it is everywhere obtainable. Dr. Neuber's attention was drawn to its possible merits by the appearance in the clinic of Professor Esmarch of a patient who reported that his arm had been badly hurt eight or ten days before while he was at work upon a moor. The injured arm had been simply covered with mould and protected by a rude wooden splint. The patient appeared to be in good general health. When the primitive dressing was removed the surgeons were astonished to find that with an extensive laceration of the soft parts of the arm, a rupture of the wrist joint, and a fracture of both bones of the fore arm, the wound was free from suppuration—in some parts already united by first intention, in others granulating in a satisfactory manner. The physical condition of the patient and the purity of the country air may have contributed somewhat to the healthy condition of the seemingly neglected wound; but, as subsequent trials proved, the main protection came from the antiseptic mould; a dressing most easily obtained where other antiseptics are to be had with difficulty. Country practitioners and workmen on railways and other works away from surgeons and surgical appliances will do well to bear this fact in mind. Of course care must be exercised in selecting turf-mould for such purposes from spots not likely to be subject to local contaminations, else it might serve to introduce the very germ which it is sought to avoid and exclude.

SEWING MACHINES IN GERMANY.

In a long communication from Berlin a correspondent of the *Sewing Machine Journal* sets forth very clearly the reason why the introduction of improved sewing machines of American manufacture has been so difficult in Germany. After describing the failure of several companies to work up a German market for their machines by a liberal distribution of samples, by establishing local agents, and so on, he attributes the failure mainly to the high prices asked for American machines. Even where the American machines are far superior to German imitations the preference is given to the cheaper machines. "The production of sewing machines in America is attended with more expense than in Germany, owing to higher wages; to which must be added freights, duties, shipping expenses, and commissions to agents. These increase the cost of American made machines in this market considerably. Germany is producing sewing machines more cheaply than any other country on the globe; and the quality of German machines has been greatly improved in the last ten years. German machines are provided with all the modern improvements, such as loose pulley, automatic bobbin winder, shuttle ejector, tension liberator, etc.; while most of the old American companies refuse to introduce those essential improvements on their machines. In consequence of this fact German machines are very often preferred. For instance the Wheeler & Wilson machines still have the bobbin winder on the stand under the table. For this reason some dealers do not want them.

"Another reason why American manufacturers cannot so easily gain a foothold in this country is the very close relations existing between the dealers and manufacturers here. The dealers are frequently financially dependent upon the manufacturers, and are too frequently visited by their travelers, etc. These are circumstances which the American manufacturers cannot so easily overcome."

To meet this difficulty the way suggested is for American manufacturers to "branch out," as the Singer Company has done. The only competitor who has made himself felt by the German manufacturers is the general agent of this company, whose success is attributed to their method of disposing of machines in a way to create a demand among consumers, thus compelling local dealers to supply them.

Another fact of importance to American manufacturers is the promptness with which their machines are imitated in Germany as soon as a regular demand has been created, unless the machines are fully protected by patents. These imitation machines are sold at exceedingly low rates, for example the German machines of the Singer pattern are sold in Berlin at from ten to twelve dollars, wholesale, complete machines with all improvements.

Hops and Hop Growing in New York.

The hop growing region of New York embraces parts of Schoharie, Otsego, Herkimer, Oneida, and Madison counties. The extent of the industry and the manner in which the gathering of the hops is effected are well described by a correspondent of the *Evening Post*, "H. D. C.," in a letter from West Winfield.

It will be noticed by inventors that hop picking machines are as yet but little used, though promising experiments have been made in this direction. The field for invention here is a wide one and well worth cultivating.

The principal gateways to the hop region at present are the junction of the Cooperstown Railroad with the Albany and Susquehanna and the city of Utica. From these points hundreds of men, women, and children are now daily hurrying to the hop fields. It requires a good deal of skill and experience on the part of growers to manage these people so as to get the work done with as little waste of time and

product as possible. Strikes are not uncommon at the most critical period of the hop picking season. When these occur the grower is apt to accede to the terms of the pickers, because a few days or a week's delay may endanger all the hops he has still on the poles. The hop picking season has a cheerful side also. The occupation is healthful, and many go to the smaller and more retired fields to pick for their health. The open air, the pungent aroma of the hops, and the useful exercise excite digestion and give the picker an appetite which he or she needs as a prerequisite to invigorated physical condition. Before the picking season closes the young people have their dances and their frolics, which partake of the mixed character of country and city ways and manners.

WAGES.

The work of the pickers is done "by the piece," the unit of labor being the box. A field of good pickers will average two boxes a day each, though some who turn a deaf ear to the gossip of the yard and attend strictly to business may fill three and even four boxes. The four-box picker is not usually as highly esteemed by the grower as a slower one, for the reason that he is apt to have his pickings too liberally mixed with leaves and stems. The picker's pay averages fifty cents a box. The larger grower sometimes offers as high as seventy-five cents, in order to secure his crop before it can be injured by frost or the equinoctial storms. Except in the small yards that are picked by help from the immediate neighborhood, provision is made for boarding and lodging the pickers on the farm where they are employed. The price of board is placed at the lowest possible figure, and is deducted from the pay on settling day. The picker's account is kept by checks, one being given for a box or a given number of boxes. These are exchanged for larger ones, and when the poles are all stripped the checks are redeemed in cash. The boxes are constructed in groups of four. Each picker usually fills his own box, but it is not uncommon for two or three persons to join forces and to divide the earnings. A mother and two children are often found picking in one box. Many women take their little children to the field, receiving such assistance as the older ones can render, while the smaller ones play in the dirt till they are tired and then go to sleep on the hop sacks or under the shade of neighboring bushes. Besides the pickers who are paid by the box, "tenders" are employed by the day, whose business it is to pull the poles, to strip off the vines, and to deposit the latter convenient to the picker's hand.

USE OF MACHINERY.

Within a few years several experiments have been made in the southern part of Oneida county with hop-picking machines, but no substantial success has yet been achieved. An improved machine now at work in a large yard near this village was observed by the writer a few days ago. It is a simple contrivance, which the patentee, who was operating it, acknowledged to be as yet in an imperfect and experimental state. It consists of a set of small rollers geared upon bearings which separate or draw close together by means of spiral springs. The hop vine is cut from the poles in pieces, and is fed between the rollers, butt end first. The vine and leaves pass between the rollers, but the hops break off in front of the rollers, drop down upon a receiver, and are carried to a table where two persons are kept busy picking out the leaves that may follow the course of the hops. The machine operates somewhat like the common clothes wringer, the hops, being more bulky than the vines and the leaves, breaking off when they come to the rollers, as a shirt-button is torn from its fastening while the shirt passes smoothly between the rollers which press the moisture from it. Last year this hop-picking machine was operated by foot power, the man who fed in the vines also plying a foot treadle as a motive-power. The patentee has this year geared his machine to power, which is operated by a sheep. The power is the common treadmill used by farmers who do their churning by dog or sheep power. When the writer saw this hop-picking machine in operation it was run by a medium-sized, mild-eyed ewe, whose plaintive bleat now and then pleaded to be released from the endless up-hill journey. Near by two other wool-bearers were tethered waiting their turn on the treadmill. By thus changing sheep frequently the three are able to keep the picking machine running throughout the day. To operate the machine to its full capacity requires two persons to fetch the vines from the poles, one to feed, and two to pick out the leaves that drop down among the hops. The machine does its work so well that it promises to come into general use as soon as it can be made to do more than it now does. The five persons who are required to attend it could pick nearly as many hops as the machine does.

THIS YEAR'S CROP.

The crop this year is considerably below that of last year. In Otsego county the estimate is two-thirds; while in Herkimer, Oneida, and Madison growers expect three-fourths of last year's yield. The price, however, is so strong that growers are feeling in the best of spirits. No one thinks of selling for less than fifty cents, while the expectation is for considerably more than this. As it is estimated that ten cents a pound is the average cost of production, the hop-growers this year are in a fair way to make money.

General average for seventeen years $34\frac{1}{2}$ c. nearly. The total acreage of hops in this country in 1879 was 46,808, of which this State had 39,072. Of the total produc-

tion of 26,588,814 pounds this State furnished 21,663,131 pounds. Wisconsin produced 1,963,427 pounds. Statistics show that while the New York yield increased in ten years from 17,000,000 pounds to 21,000,000, that of Wisconsin decreased from 4,000,000 to about 2,000,000.

The soil of California seems to be the best adapted of any in the United States, so far as experiments have been made, for raising hops, the yield per acre being 1,274 pounds. At the prices prevailing this year the hop farmer of the Pacific slope will thus earn \$637 per acre, or several times the price of his land.

The hop industry of this State, and in fact of this country, is of comparatively recent origin. The first vines in America were planted by James D. Cooleage, in the town of Madison, Madison county, seventy-four years ago. Forty years ago there were raised in this State only 2,236 bales. The counties which now lead in this industry have always led; but it looks as if the seat of the hop empire would in a few years be transferred from Otsego county to Oneida. Hops and cheese have an affinity which induces them to remain close neighbors. The hop vine requires rich soil, and an abundance of fertilizer on soil that is naturally thin and weak. The dairies furnish much of the fertilizer used in the hop-yards throughout this part of the State, where cheese-making and hop-growing are almost the only sources of income to the farmers.

New York Academy of Sciences.

The Geological section of the Academy of Sciences met at their rooms, 12 West 31st Street, Monday evening, Oct. 9. Dr. J. S. Newberry president, in the chair. Mr. Chamberlain exhibited some beautiful specimens of hiddenite from North Carolina. Mr. Geo. F. Kuntz exhibited fine crystals of apatite from Rideau, Canada, also large plates of phlogopite (mica) which exhibited a very interesting property, viz.: when held between the eye and a gas light, six rays were seen to extend from the light at angles of 60° from each other, each ray being made up of a series of short parallel bright lines very close together. Mr. F. Cope Whitehouse exhibited, by means of a lantern, a large number of views of the caves on the Island of Staffa, the most interesting being the famous Fingal's Cave. After fully describing their form, size, etc., Mr. W. stated his belief that they were not, as generally supposed, produced by natural causes, but are artificial caves made by the hand of man at some very early period. Among other reasons given for this conclusion were the following: The high and pointed roof of Fingal's Cave, resembling the roof of a Gothic church, whereas natural caves have a low and flatly arched roof; the caves of Staffa are protected by breakwaters, or other barriers, from the force of the waves of the Atlantic, which could hardly have excavated caves of such depths at a few points; some of the caves are twelve times as deep as they are wide, with straight sides; the basaltic columns do not crumble nor form shingle, yet none of their remains are found near the mouth of Fingal's Cave, hence they must have been carried away by man to a great distance, probably to Scotland. Some discussion followed the reading of the paper by Prof. Day and others, showing that the members of the Academy were scarcely prepared to accept the conclusions of Mr. Whitehouse.

The Comet and the Moon in Arizona.

A correspondent who resides at a mining camp on the mountains in the south-eastern corner of Arizona, says that the great comet comes into view there about three o'clock every morning, presenting a wonderful spectacle, remaining visible until after the full sunrise.

The brilliancy of the moonlight at this elevated station is such that mountains seventy miles distant are seen.

Improved Mortar.

Sawdust is said by some one to be better than hair in protecting rough cast from peeling and scaling under the influence of frost and weather. The sawdust should be first dried and then thoroughly sifted, in order to remove the coarser particles. A mixture is then made of two parts sawdust, five parts sharp sand, and one part cement, which should be thoroughly stirred together and then incorporated with two parts of lime.

ON the authority of a Pittsburg paper there are fifty-one completed rolling mills and steel works in Pittsburg and Allegheny county, and two building. Of these, eight are rail mills, six making only light rails, twelve are crucible steel works, one makes cemented steel only, three are Bessemer steel works, seven are open-hearth steel works, and one open-hearth steel works is building. Besides these are several other iron and steel works located outside of the county, but owned in Pittsburg.

WHAT a learned physician of New Albany, Ind., pronounced to be a cancer in a boy's throat was discovered by the mother of the child to be caused by a beard of wheat three inches long and containing eight grains of the cereal.

PEARL fishing is pursued by no less than 1,000 divers on the coast of Lower California. The pearl oysters are found from one to six miles from shore, in water from one to twenty-one fathoms deep. The yearly product is about \$500,000.