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Contents.

(Illustrated articles are marked with an asterisk.)

Table listing various articles such as Agricultural inventions, Asbestos paint, Atomizer, mechanical, etc., with corresponding page numbers.

TABLE OF CONTENTS OF

THE SCIENTIFIC AMERICAN SUPPLEMENT,

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Table listing sections I through IX, including Engineering and Mechanics, Technology and Chemistry, Electricity, etc., with sub-sections and page numbers.

INVALIDATION OF PATENTS BY PUBLIC USE.

In nearly all foreign countries, if an invention is brought into public use before the application for a patent is filed, the patent will be rendered invalid. In this country the same rule holds, except that no invalidation of the patent will take place unless the invention was in public use for more than two years prior to the application for a patent.

The law applicable to the case is section 24 of the act of July 8, 1870, now embodied in the Revised Statutes as section 4,886, which declares:

"Any person who has invented or discovered any new and useful art, machine, manufacture, or composition of matter, or any new and useful improvement thereof, not known or used by others in this country, and not patented or described in any printed publication in this or any foreign country before his invention or discovery thereof, and not in public use or on sale for more than two years prior to his application, unless the same is proved to have been abandoned, may, upon payment of the fees required by law, and other due proceedings had, obtain a patent therefor."

An interesting case that came under this section of the law was that of Worley vs. the Loker Tobacco Company, lately decided by the United States Supreme Court. A patent was granted to Worley & McCabe, August 22, 1876, for a mode of finishing plug tobacco. The invention consisted in heating the plugs of tobacco up to 140°, while they were between metal plates in a press, subject to heavy pressure. The pressing between plates and the heating had been previously done, but separately.

It appeared from the testimony that Worley made the invention for his employer, McCabe, who was the owner of a tobacco factory in St. Louis; and that the invention was there in public use for more than two years before any application was made for the patent. The court said:

"It has been repeatedly held by this court that a single instance of public use of his invention by a patentee for more than two years before the date of his application for his patent will be fatal to the validity of the patent when issued. (McClurg vs. Kingsland, 1 How., 202; Consolidated Fruit Jar Company vs. Wright, 94 U. S., 92; and Egbert vs. Lippman, decided at the present term.) We think the testimony of the appellants themselves shows such a public use of the process covered by Worley's patent as to render it invalid. This evidence brings the case clearly within the terms of the decision of McClurg vs. Kingsland (1 How., ubi supra), where it was declared that if a person employed in the manufactory of another, while receiving wages, makes experiments at the expense and in the manufactory of the employer, has his wages increased in consequence of the useful results of the experiments, makes the article invented, and permits his employer to use it, no compensation for its use being paid or demanded, and then obtains a patent for it, the patent is invalid and void. The inventor cannot relieve himself of the consequences of the prior public use of his patented invention by assigning an interest in his invention or patent to the person by whom the invention was thus used."

The decree of the Circuit Court, which held the patent to be invalid, was therefore affirmed.

THE PROPAGATION OF CODFISH.

The successful propagation of codfish by the United States Fish Commission, at Gloucester and Wood's Holl, Mass., has been followed by a very promising attempt to make this city a center for the distribution of impregnated eggs for restocking our more southern waters.

This important enterprise is largely due to the intelligence of Mr. E. G. Blackford, of Fulton Market. Seeing that large numbers of live cod, many of them ripe for spawning, are brought to this market every season in the wells of fishing smacks, Mr. Blackford suggested to Professor Baird, United States Fish Commissioner, that an almost unlimited quantity of artificially impregnated eggs might be obtained here at small cost. The suggestion was acted upon about six weeks ago, and two of the experts of the commission who had conducted the cod-hatching operations at Gloucester and Wood's Holl were detailed to take charge of the work here. About the middle of February a number of fish taken off Fire Island were stripped, yielding, it was estimated, about 4,000,000 eggs, which were properly impregnated and sent to Washington for hatching there. Owing to faulty packing for transportation the eggs spoiled on the journey. A few days later another large lot of eggs was shipped in jars, kept cool by packing in ice, and arrived in fine condition; and since then several shipments of impregnated eggs have been made, all successful.

Though the operations were begun somewhat late in the season the results seem to show that an abundant supply of cod eggs can be readily obtained here. By beginning the work in the fall it is believed that as many as 100,000,000 impregnated eggs can be secured in a season, with little trouble and at small cost.

The officers of the Fishmongers' Association have placed their rooms at the disposition of the Fish Commission for their work, and the captains of the fishing smacks have been extremely liberal in allowing their fish to be examined by the experts, and in furnishing without charge the fish found suitable for stripping.

The range of the cod along the coast is from the polar regions on the north to Cape Hatteras on the south. It is

found all the year round on the rocky spots, also frequently on sand and clay, but seldom, if ever, on muddy bottoms. Codfish are gregarious in their habits, going in schools of greater or less size, and are governed in their movements by the presence or absence of food, the spawning instinct, and the temperature of the water. In schooling both sexes are always found together. They sometimes make long journeys from one bank to another. They live at a depth varying from a few feet to over a hundred fathoms. The cod seems to have but few enemies, its principal foe being the dogfish. Evidence shows that the cod spawn every year. During the first of the season examination discovered no mature fish; again, later in the season, no spent fish were seen with any eggs remaining. The first ripe females are found in September at Gloucester, and later along the Long Island coasts. The cod deposits its eggs gradually during a long period. When the female becomes ripe she remains near the bottom, while the male often swims higher up. When the sea is smooth the eggs float near the surface of the water; then the chances of impregnation are more favorable. The following numbers of eggs have been known to have been taken from various sized fish: From one weighing 70 to 75 pounds, 9,100,000 eggs; from a 51-pound fish, 8,989,094; from a 30-pound fish, 3,715,687; from a 27-pound fish, 4,095,000; from one of 22 3/4 pounds, 3,229,388; and from a 21-pound fish, 2,732,237.

Mr. Blackford, whose labors in promoting fish culture are so well known, has rented a large room in the new Fulton Market building, and will fit it up and furnish it for the gratuitous use of students of fish culture. There will not only be room for such work as the United States Fish Commission may wish to carry on, but all those interested in zoological and biological research will be welcome. For active research in the marine fauna, New York, with its adjacent waters, presents many advantages, and with the use of such a room, together with the specimens which Mr. Blackford will gladly furnish, the cause of science cannot fail to be notably benefited.

In this connection it is proper to add that the annual trout exhibition will begin in Fulton Market April 1, and the annual meeting of the American Fish Cultural Association will follow on the 3d and 4th. Papers are promised by Mr. G. Browne Goode, of the Smithsonian Institution, Washington, D. C.; Professor Bean, Professor Ryder, of Philadelphia; Professor Atwater, and Messrs. F. Mather, Barnett Phillips, and E. G. Blackford.

THE SMOKE NUISANCE.—PROBLEMS FOR INVENTORS.

An exhibition of appliances for the abatement of smoke has been running for some weeks at South Kensington, England, and its success has been so great that its promoters are talking of holding in London a thoroughly international exhibition of the same character.

Meantime the Common Council of the City of Cincinnati, O., have taken hold of the problem in a vigorous way by passing an ordinance making it an offense punishable by fines to maintain a furnace which needlessly pollutes the air with smoke. The ordinance provides that all furnaces used for purposes of trade or manufacture within the city limits shall be so constructed as to effectually, or in the best possible manner, consume or burn their own smoke. No specific device or mode of furnace construction is demanded; but merely that the best obtainable construction of furnace shall be used and so carefully attended to that there shall be no avoidable discharge of smoke into the air. An inspector of smoke is appointed to see that the provisions of the ordinance are properly executed.

We are informed that a visiting committee from Cincinnati have been to England, where the smoke nuisance has longest been experienced, to study the devices on exhibition at South Kensington, and on record in the British Patent Office, but have returned without finding any adequate remedy for the evil. The means that have been devised for mitigating the smoke nuisance are numerous and ingenious; but there appeared to be nothing entirely satisfactory.

It is unreasonable to suppose that the problem is incapable of solution. The products of the perfect combustion of the smokiest coal are solid ashes, which remain in the crucible or furnace, and colorless gases, which make no visible addition to the atmosphere. The presence of smoke is always proof of imperfect and wasteful burning.

It is the business of our inventors to accomplish, under the varying and often unfavorable conditions of metallurgical and manufacturing processes, as perfect a combustion of the fuel used as is possible in the laboratory; either primarily in the furnace or by the subsequent reburning and washing of the sooty and volatile products which so largely pollute the air of our Western cities and manufacturing towns.

The demand for such inventions is wide and urgent. The action of the City Council of Cincinnati is likely to be generally imitated, certainly if it has the effect of materially abating the nuisance complained of there; and the scope for successful effort in invention in this field is as wide as the demand for an abatement of the smoke nuisance and the almost infinite variety of industrial operations employing soft coal as fuel.

Original Research in Australia.

The Royal Society of New South Wales has undertaken to encourage original research by offering eight prizes of £25 (\$125) each for the best communication containing the results of original study or observation on as many specified subjects. Four of these—"On the Aborigines of New South

Wales," "On the Treatment of Auriferous Pyrites," "On the Forage Plants Indigenous to New South Wales," and "On the Influence of Australian Climates and Pastures on the Growth of Wool"—are to be sent in before the 30th of September next. The other four—"On the Chemistry of Australian Gums and Resins," "On the Water Supply of the Interior of New South Wales," "On the Embryology and Development of the Marsupials," and "On the Infusoria Peculiar to Australia"—must be submitted before August 31, 1882. The competition is unrestricted, and as some of the subjects may be investigated outside of Australia, the contest may be of interest to students in this country. The office of the society is in Sydney, N. S. W.

#### STEAM BOILER NOTES.

The late boiler explosion at Jewell's Flour Mill in Brooklyn, N. Y., a short notice of which was given in the last number of the *SCIENTIFIC AMERICAN*, has drawn attention in a special manner to a State law relating to boiler insurance and local official inspection of boilers. It is alleged that the passage of the law was much influenced if not entirely procured by the agents of boiler insurance companies, both native and foreign to this State. The following is the clause of the law that is quoted by the Brooklyn *Eagle* as applying to that city, which was passed in 1874. It has been repealed or amended since the Jewell explosion:

"SECTION 1.—All steam users, manufacturers, or corporations possessing the guaranteed certificates, unrevoked and in full life, of any fire insurance company now incorporated, or hereafter incorporated, or of any company organized or hereafter organized, for the purpose of making guaranteed steam boiler inspections, and which have complied with the insurance laws of the State of New York, having duly filed a statement with the Superintendent of Insurance or other authorized officer, of its conditions, and duly paid license fees and taxes, shall be exempt from any further inspections, and from the pains and penalties of the above-named acts."

It appears to have been applicable to insurance companies making boiler insurance a part or the whole of their business. In some cities and States, notably in the State of Connecticut, the certificates of such companies only as make boiler inspection and insurance an exclusive business are sufficient to exempt boiler owners from official inspection and control.

In other localities, the city of Philadelphia, for example, all boilers that are insured must be tested annually by hydrostatic pressure according to law, and the city inspector, who is independent of the police, but under the direction of and appointed by the mayor, may disapprove of any boiler for a given pressure, notwithstanding the boiler has been approved and insured at that pressure.

It seems, however, that none of these laws that leave the matter of limiting the pressure at the discretion of a single person, the chief inspector of an insurance company or the local inspector, as the case may be, are sufficient to prevent either interest or prejudice from becoming an element in the problem of how much pressure may or may not be allowed in a given case. There being no rule or law except the judgment of the inspector, too much latitude as well as too much risk is often assumed by even the most competent inspector. And as a rule they are generally arrogant and conceited in inverse ratio to their fund of practical science.

In the Jewell explosion investigation, which was begun before the coroner on the evening of February 27, it came out that the two exploded boilers were twenty-one years old, seven feet diameter, composed of iron "a full quarter" of an inch thick, and that the owners, having increased their machinery, required more steam than thirty pounds, which they had previously carried, and which was ample for their purposes at that time. Whether or not this increase of pressure was denied them by the city inspector did not appear, but the Hartford Steam Boiler Inspection and Insurance Company were ready to take the risk at fifty pounds, after having ordered a number of soft patches to be put on defective seams on the bottoms of the shells. They were then inspected, testing with a hammer, and proved by personal examination internally and externally. They were accepted for insurance, and a \$10,000 risk was assumed by the Hartford Company at 1½ per cent premium, the policy taking effect some twenty months before the explosion took place. They were again duly inspected at the end of the year—the hydrostatic pressure was not applied on this latter occasion—and the policy was renewed, and a certificate for fifty pounds of steam issued on the 14th of June, 1881, which was to expire on the 14th of June, 1882.

It would seem that a competent State commissioner ought to be appointed to establish a rule for the limitation of steam pressures. The rule may be very simple, something on the model of the Manchester Board of Trade rule, which is simply to determine by one process of multiplication what thickness of good fair iron is required for a given pressure on a cylindrical shell. For example: On a seven foot shell to carry fifty pounds of steam, required the thickness of the plates, single riveted? Rule: Multiply the diameter in inches by the pressure in pounds, and point off all the figures in the product as decimals, which will be the thickness in decimals of an inch; thus  $84 \times 50 = 0.4200$ , nearly seven-sixteenths of an inch.

Calling the Jewell boilers 0.3 of an inch thick, and all other parts equally strong, 35 pounds of steam would have been allowed and no more under this rule. On the other hand, if 50 pounds pressure must be had, the boilers being

still the same diameter, their shells would require to be about seven-sixteenths of an inch thick, with all other parts fully as strong. It is more than probable that, under this rule, the boilers having been well cared for, the defects from which the explosion arose would not have been developed to a dangerous degree and no explosion would have taken place.

#### COTTON PICKING BY MACHINERY.

BY PROF. C. V. RILEY.

In perusing the article on "Cotton and its Future—An Opportunity for Invention," as appearing in the *SCIENTIFIC AMERICAN SUPPLEMENT* of February 11, 1882, one acquainted with the cotton country and the actual work of harvesting the crop, cannot but be struck with the impracticable nature of most of the notions presented. That the devices described and the ideas advanced are chiefly those of men unfamiliar with the requirements which they have attempted to meet is easily seen. It is surprising to notice that most of the cotton-picking inventions, as shown, are the product of Northern minds, and this may account for their being so foreign to the work which they were designed to perform.

Three principles have been employed. One is that of raking off the cotton by points which are coarse or fine, and grouped comb-like or brush-like; the second is that of applying spindles on which the fiber is to adhere and wind into rolls; while the third is that of suction by an exhaust apparatus.

These principles, as applied in hand-pickers for taking one boll at a time, are inferior to the bare hand alone, and only offer superfluous complications and expense.

As used in large machines to be hauled over the rows, all so far contrived seem better calculated to injure and waste cotton than to gather and save it. The inventors do not seem to have taken into consideration the fact that the crop does not all open at once, and that it must be gathered by a series of successive pickings, at each of which only a portion of the entire crop is open.

They appear to proceed on the erroneous idea that the whole crop matures and opens at the same time, so that it can be gathered all at once, while the plants may be dealt with, injured, or destroyed as though they were of no further value.

No planter will admit to his field a machine to pick the first crop that will damage the second, or to gather the second if it will impair the "top-crop." Hence planters have no use whatever for such contrivances as have so far been patented.

Where the raking principle is introduced in large machines the plants are sacrificed and torn in a manner not allowable, while spindles which scratch or drag through the plants must similarly break off the branches, leaves, and unopened bolls.

If those machines which employ the suction principle have been made to do less injury than the others to the after-crop, they do the work little better and possess in the highest degree a fault common to all, which is that of taking up with the fiber fragments of the foliage and bolls, besides dirt, etc., thus greatly impairing the market value of the cotton.

The fact is the question of harvesting cotton by machinery is a most difficult one, which, like that of gathering the great corn crop of the North by similar means, has baffled the best genius of our country, and, unless some other principles than those in the machines thus far patented can be introduced, the problem must remain unsolved. Let those who wish to exercise their ingenuity in this direction not forget that cotton harvesting extends over a period of two or three months in any given field; that the cotton when gathered is valuable in proportion as it is clean, *i. e.*, free from leaf, dirt, trash, etc., and that no machinery in which these considerations are ignored stands any chance of superseding the nimble fingers of a young dandy.

#### American versus English Nailmakers.

Discussing the prospects of the nail trade the Birmingham correspondent of the London *Ironmonger* says:

Foreign competition in this branch is relaxed by the action of the American nailmakers, who have advanced prices from 15c. to 20c. per keg. These advanced rates, which are much above those demanded by English makers, have of course greatly improved the chances of English nails in Canada, Australia, and other neutral markets, though many even of our own colonists appear to be strongly biased still in favor of the American article, owing to its greater uniformity of quality. It is not denied that English manufacturers can produce as good or even a better nail than the Americans, but they do not always do so; and the merchants who conduct the trade are apt, in buying, to sacrifice higher considerations to cheapness. The Americans are wiser in their generation, and, frankly recognizing the impossibility of competing with English makers in cheapness, they strive to excel in quality, uniformity, and excellence of patterns. On the whole, these tactics have been of great service to them, and have given them a footing in many markets from which it will be no easy matter to dislodge them.

REMEDY FOR SIMPLE CONTINUED FEVER.—Acid. hydrobrom., 1 dr.; Syr. simplicis, 2 dr.; Aq. ad 1 oz. M. Sig.—Every hour.—*Fothergill*.

Dr. Fothergill, in speaking of the above formula, says it will probably constitute *par excellence* the fever mixture of the future. It is especially indicated where there is cerebral disturbances.

#### About Fires.

To the Editor of the *Scientific American*:

It appears to me that all the methods proposed deal with the fire from the outside, whereas the fire is in the inside of the building, and it is upon the inside that the remedy should be applied.

It is idle to talk about fire-escapes, fire-engines, and such appliances, with buildings so high that no stream of water will reach the top, and no ladder is long enough to be of service. During the late fire several people were burned up before the fire department even got there. What is wanted is instant application of water from the inside the moment a fire occurs.

At my works I have a device which is simple and effective. Having to deal constantly with fires, I require something that is instantaneous in its action. My device is a railroad tank, at the bottom of which is a large pipe, closed by a valve. From this pipe perforated pipes lead to every point in the factory where fires are expected. The short end of a lever at the top of the tank is connected by a chain with the valve at the bottom. When a fire occurs, the long end of the lever is pulled down, by which the valve is opened, and every point desired to be reached is treated, as it were, to an instant shower bath. This same device could be applied to any of our large buildings and to our theaters, by which arrangement the whole stage could be treated to an instant shower bath. Perforated pipes could be led over the top of the stage and over all the combustible scenery. In buildings, I would suggest two large tanks near the roof, from which perforated pipes should lead over the elevators, all the hallways, stairs, and such rooms where combustible material is stored or being manufactured. The connection with the lever of the tank or tanks should be so arranged that the valve could be pulled from every hallway.

I feel satisfied that with the above device no loss of life and no serious loss of property could occur, and I confidently recommend it after an experience of twelve years, during which time it has never failed me.

PAUL A. OLIVER.

Wilkesbarre, Feb. 21, 1882.

#### Daniel F. Beatty's New Organ Factory.

Last fall, as our readers will remember, the extensive organ factory of Mr. Daniel F. Beatty, at Washington, N. J., was entirely destroyed by fire. The work of reconstruction was begun at once with the owner's characteristic energy, and within five months a new establishment, larger and more admirably furnished than the old one, was ready for operation. It is now turning out thirty organs and pianos a day; an output which the proprietor says can be doubled in thirty days and trebled in ninety days.

Mr. Beatty's splendid success as a manufacturer of musical instruments is due very largely to his plan of reaching his customers without the intervention of middlemen. In this way the buyer gets his piano or organ free from intermediate charges; and Mr. Beatty's rare executive ability and capacity for organizing labor reduce the single profit—the manufacturer's—to the lowest figure.

#### Spontaneous Combustion of Bengal Lights.

The author shows that the spontaneous explosion of mixtures containing potassium chlorate along with sulphur is generally due to a trace of sulphuric acid present as impurity in the latter substance, and he agrees with M. Du Moncel in rejecting the theory which ascribes such accidents to electric action.—*J. Clouet, in Journal de Pharmacie*.

#### Plugging Diamond-Drilled Hole.

It is no easy matter to plug up a diamond-drill hole from which there is a strong flow of water, frequently under great pressure. When a hole is to be plugged there are forced into it small bags of beans and flaxseed. The plug—made of dry pine and from 10 to 15 feet in length—is driven in after these bags and forces them forward in the drill hole. Also, a hole is sometimes bored into the end of the plug, which hole is filled with flaxseed. The flaxseed and beans are caused to swell to such an extent by the hot water that the hole is as compactly filled as though closed with molten lead.—*Virginia Enterprise*.

#### A Curious Ceremony.

That enthusiastic student of Zuni life and religion, Mr. F. H. Cushing, of the Ethnological Bureau of the Smithsonian Institution, has brought to the East from New Mexico six chiefs of the Zuni tribe of Pueblo Indians, to enable them to perform at the sea-side an ancient ceremony which has been handed down in its minutest details from a period so remote that tradition is unable to say when it was last performed. The ceremony is proof that the ancestors of the Zuni once lived on the shore of an ocean, but what ocean and at what point are problems for science to work out.

#### Patent Cases in the Court of Claims.

The House Committee on Patents agreed, February 23, to report favorably Mr. Stephens' bill providing that the jurisdiction of the Court of Claims shall include all claims against the United States for the use of patented inventions employed in the public service. The need of this extension of the jurisdiction of the Court of Claims was discussed in these columns in the article on the "Relation of the Government to Patentees," in the issue of February 18.