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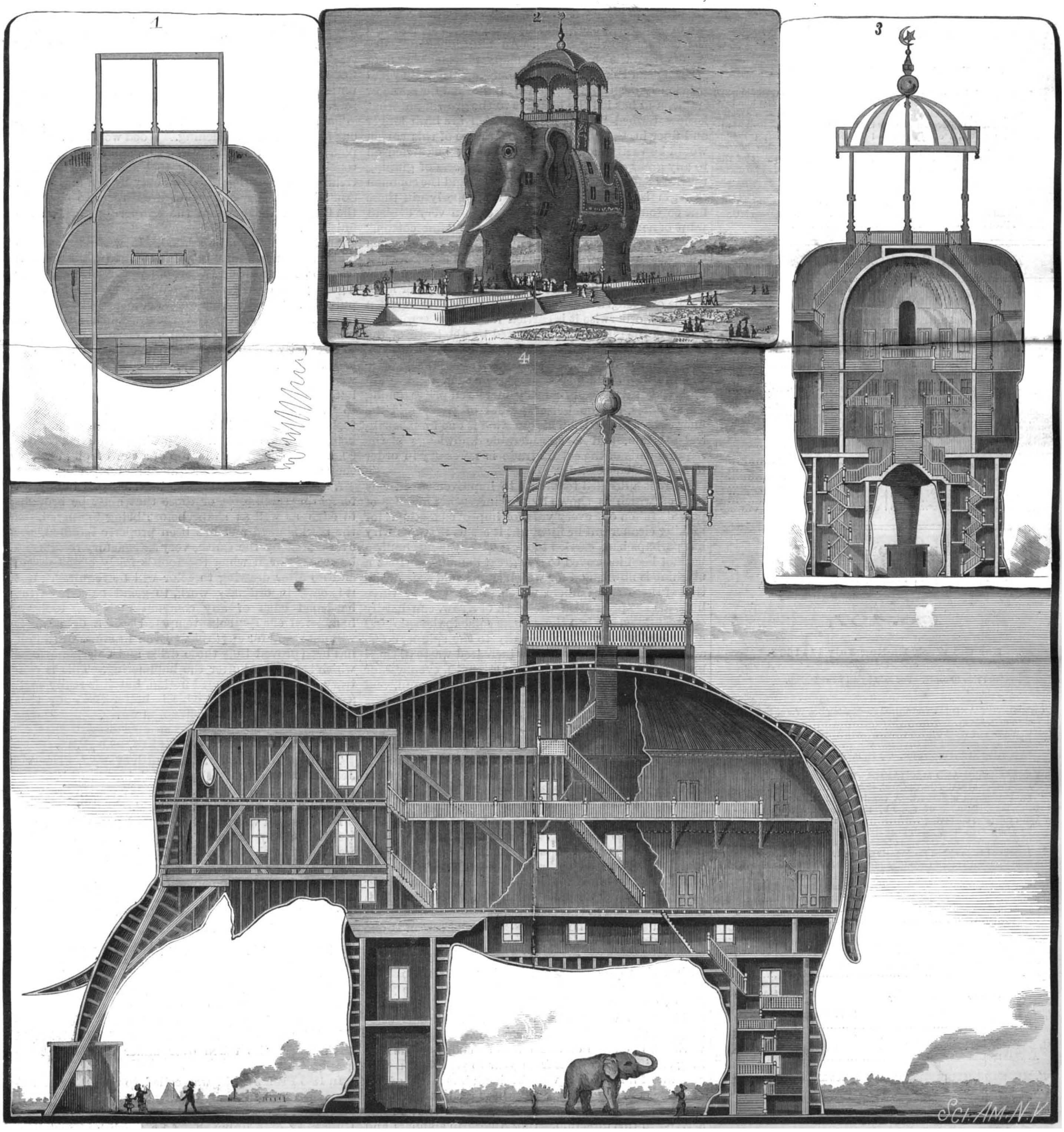
THE COLOSSAL ELEPHANT OF CONEY ISLAND.

The reputation that the American people have long had of always doing everything on the grandest possible scale, has received lately a very substantial confirmation in the two monuments that have recently been bestowed upon this country. The Washington Monument and the statue of Liberty are the greatest works of art in height and magnitude that have been raised by the hands of man since the Tower of Babel. In addition to these there is a third monument, facetiously styled the eighth wonder of the world, that has recently been raised in the neighborhood of New York, that for one reason deserves to be,named in the same connection with the foregoing, namely, on account of its size. The Colossal Elephant at Coney Island has not been favored with much serious public attention, owing to the fact principally that it is not an artistic work, and secondly, because it is the project and property of a stock company, whose unexalted aim was to rear a structure that would serve, not so much to elevate the public mind artistically, nor to stand as a monument to some of our noted forefathers, but rather to abstract the unwary dime from the inquisitive sightseer. This fact, and the grotesque nature and enormous size of the colossus, has deprived it, up to this time, of much consideration, but this should not deter us from inquiring how a building of such unique design and original construction was called into being.

It was designed and built under the personal supervision of the architect, Mr. J. Mason Kirby, of Atlantic City, N. J. It was first intended to make it a hotel, but later this idea was abandoned, and it was decided to construct the interior with the purpose of using it as an auditorium for concerts, etc., while the platform on the top, or the howdah, as it is termed, would serve as

(*Continued on page* 21.)



THE COLOSSAL ELEPHANT OF CONEY ISLAND.

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NEW YORK, SATURDAY, JULY 11, 1885.

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(Illustrated articles are marked with an asterisk.)

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THE SCIENTIFIC AMERICAN SUPPLEMENT,

No. 497,

For the Week Ending July 11, 1885.

Price 10 cents. For sale by all newsdealers.

COTTON GINNING IMPROVEMENTS NEEDED.

There are now in the United States between twelve and thirteen million cotton spindles, the property invested amounts to hundreds of millions of dollars, and the product each year runs nearly into billions. Seven-eighths of the cotton spindles of the country are subject to all the inaccuracies incident to the original cotton gin of Whitney, and the other eighth is only exempt from these troubles by reason of their using the Sea Island cotton, which is longer and finer than the Upland or short staple varieties.

The competition between the various cotton spinning and weaving concerns demands the greatest production with the least waste. Curiously, cotton has grown steadily worse in quality ever since the war. Many causes have operated to produce this result, but it is principally due to the constantly diminishing acreage of the individual planters, who, instead of raising five hundred to two thousand bales each, now put into the market anywhere from three bales upward, fifty to one hundred bales being considered a large output. With our larger cotton spinning establishments, some of which work two or three hundred bales of cotton per week, the large number of different growings of cotton leads to peculiar results in the mill, which are shown by diminished production, owing to the mutilated and varying length of the fiber.

The ginning of cotton is apparently a very simple affair, but in reality it is not, and old ginnery hands are in demand at exceptionally high wages all through the cotton growing States. An additional difficulty results from the changing in many mills making finer sheetings and shirtings, to numbers finer than they had previously been spinning. This has called for a longer staple, and has led the planters to the growing of what is now termed "fine cottons," which are both longer and finer in their length. The culture of this cotton would be vastly more profitable could it be carried on to any great extent; but the usual process of ginning the Sea Island is very slow and tedious, and the common saw gin is entirely inadequate to properly gin these fine cottons. There seems, then, to be a very evident want of new ginning machinery for the "fine cotton," which necessitates a different application of mechanism from anything now in the market. The new gin must treat a longer fiber of cotton or "lint" than the saw gin is capable of handling, for in the latter the fiber must not be of a length much to exceed the distance between two saws, otherwise it is carried lengthwise across the breast of the gin and is mutilated by the teeth of the saw. Something which will obviate this difficulty would find a very large market at almost any price within reason. "Lint" coming from such a gin would find ready sale at considerably increased prices among the spinners, for the better grades of yarns and the finer classes of goods. This question is one for mechanical solution, and a considerable knowledge of the requirements of the cotton trade is necessary in order to handle it successfully.

There is a decided tendency to improvement in this respect, which is shown by the increasing number of patents taken out every year for improved methods for making cleaner lint or fiber, but it seems that quantity has perhaps been carried too far; while the mechanism has not been improved to any great amount, so that a machine is now called for which shall avoid the mutilation of these small fibers, which, when two or three hundred are pressed on the teeth of a saw, can hardly escape injury. When these fibers come to the spinning mills, the injury works decidedly to the spinner's disadvantage, in the very largely increased waste of these mutilated fibers and in a lack of strength, evenness, or regularity in the thread after it has been spun, and the trouble only ends when the cloth is finished.

Cotton may be materially injured by running the gin either too fast or too slow, but very little injury from the latter cause has ever been found when the cotton has been carefully examined after ginning. Most of it shows very clearly the harm that arises from crowding the gin, or attempting to do more than can properly be done by a gin of a certain number of saws. Another cause, and one of those to which attention should be most directed, is attempting to gin the cotton when it has been taken from the field before it is completely matured or when a considerable amount of moisture is present, so that it is damp to the touch; very great injury frequently comes from cotton which has been ginned in this condition.

The question of the proper ginning of cotton is one which is now before the cotton world. Some of the largest dealers have recently taken this matter in hand with a view of eliciting all the information possible. This question was considered so important some years since that very extensive trials were made in England and in India with a view to ascertain not only what different gins *could* do, but what they *did* do in regular working, in charge of those who attended to the ginning of different cottons from year to year, and a vast amount of information was obtained; but much of the machinery which was used in those trials, ten to thirteen years since, is now obsolete, which shows some activity in this direction. But American spinners and planters are now interested to obtain information regarding what is being done to-day, and are waiting for the appearance of an improved gin. This is a question for mechanics and inventors to solve, and there is without doubt a very large sale for a cotton gin which can accomplish a reasonable amount of output with the minimum amount of injury to the individual fibers, so that the spinner shall obtain cotton of greater value, greater strength in the manufactured product, and less waste and consequent loss in its manipulation.

EDGING BY FORGING.

In a forging shop recently the smith was dressing some cold chisels and some lathe tools. It was noticed that, by the help of his assistant, after drawing the tool to an edge, he cut off the very edges before hardening and tempering the tool. After observation showed that he had left an edge thickness of not less than one-sixteenth of an inch, somewhat more. The smith was an old workman, verging on being an old man; so he was asked the "reason why." In answer he took a bar of tool steel, heated and forged it, and made a chisel point. Then he hardened it, as usual, in clean water, scoured it, and drew it to a pigeon blue temper. A slight tap with a hammer drove the edge off as though it had been glass. He explained that good, high steel could not be hardened and tempered when drawn to a thin edge: that there was not material enough left in a fine edge to sustain an edge after hardening and maintain an edge after tempering. His plan was to harden and temper the solid metal and grind to an edge. Possibly his method was adapted only to "high" steel; and yet it is indisputable that when tools are forged to edge and hardened they frequently crumble until they have been ground and worn far below the forged edge.

There are steels that will take a cutting edge without fire and water hardening. Wood working tools, as plane irons, can be hammered to temper without ever touching water; but usually tool steel is amenable to treatment for cutting purposes only by fire and water. Sometimes it is necessary to dress tools to shape by the file, and in that case the tempering must be the finishing.

An instance may be related. It was necessary to make some miniature bobbins to hold flattened gilt wire to be spun around a core of silk thread, producing a gold yarn or thread for embroidery and braiding purposes. The bobbins were made of boxwood, and were so small that three of them would not weigh an ounce. They were run with great rapidity and needed to be exactly balanced, as they revolved around a central spindle. The tools for finishing these bobbins were of necessity made to accurate gauge, and after hardening and tempering could not be touched except to "finger stone" them to a polished edge. These tools were heated in the usual way, but instead of being plunged in water, were pushed through a cake of common beeswax on the top of a can of oil in which they were cooled. They required no tempering.

A mixture of beeswax and hard soap is handy for tempering small tools, or those that must be brought to edge as well as shape before being tempered. If the steel is good and has been properly handled, not overheated by the smith, very satisfactory results can be secured even when the tool is fairly edged down; and no after drawing to color will be required. But it is best, in ordinary work, to grind back from the hardened edge of any common machinist tool. A hammered edge—"cold tempered"—is a delusion; it will not stand for anything. Even in stone drilling it has been proved that those drills and chisels are best which are ground after the hammering. This is contrary to the old fashioned notion, but it is really fact; a ground and polished edge is better than any that can be given by hammer, fire, and water.

PROFESSOR FLEEMING JENKIN, LL.D., F.R.S.

The announcement of the death of Prof. Fleeming Jenkin, of the University of Edinburgh, which took place on the 12th ult., has been received with profound regret by the entire scientific world.

Prof. Jenkin was but little over 52 years of age, and was in the very prime of his power. His education was obtained chiefly on the Continent, his degree of Master of Arts being awarded to him by the University of Genoa in 1850. For several years after his graduation he was employed in locomotive and constructive engineering, but at a comparatively early age he became deeply interested in submarine cables and general telegraphy, a department in which he afterward achieved such signal distinction. He was connected with the laying of the first American cable, with various European and Asiatic cables, and almost his last professional work was done as one of the joint engineers to the Mackey-Bennett Cable Co. He was retained by the Government as professional adviser in testing the cables taken over under the Postal Telegraphs Act.

In 1865 Prof. Jenkin was called to the Chair of Engineering in University College, London, and three years later he was appointed to a similar chair at the University of Edinburgh. As a teacher he met with the same success which had attended his engineering practice, and the high standard of professional education which he disclosed at his inaugural address was fully maintained during the seventeen years of his connection with the University. He was the joint patentee with Sir William Thomson of several valuable improvements in apparatus for submarine telegraphy; being likewise the sole patentee of a number of ingenious engineering inventions, and was much consulted in regard to cases of disputed patents.

Under the encouragement and advice of Sir William Thomson, Prof. Jenkin began to write on scientific subjects so early as 1859, and many of his contributions possess a permanent value. His paper on "The Application of Graphic Methods to the Determination of the Efficiency of Machinery," in 1880, secured the Keith Prize of the Royal Society, and was thoroughly original. He was also the author of an excellent manual on electricity and magnetism, and wrote a history of bridges for the Encyclopædia Britannica. Many of his contributions on miscellaneous topics also attracted marked attention, and showed unmistakably the master's hand.

LIFE-SAVING FIRE APPLIANCES IN NEW YORK.

The officers of the New York Fire Department seem fully to realize the heavy responsibility devolving upon them in a great city, where buildings of ten and twelve stories are not at all uncommon, where apartment houses of even fifteen and sixteen stories are permitted, and where hundreds of people are daily crowded together in one building, and subject, in case of fire, to the same horrible fate. It is true that of late they have been somewhat aided by the loud demand for fireproof buildings, which has forced landlords and contractors to pay some attention to at least the appearance of safety; but in many cases this has been but a pretense in deference to the popular outcry, while in others, with the most honest intentions, the effort has failed. There is, of necessity, so much of combustible material, even in the so-called fireproof structures, that no substitute has yet been found to take the place of civic precautions.

In view of these unavoidable dangers, the department has been giving particular attention to its life-saving corps, and the resulting proficiency in this direction is very creditable. But in this effort, though they have done so much in perfecting the appliances for safety and rescue, their success, after all, depends in a large measure upon the coolness and bravery of the men who have the apparatus in charge. Their victory has been a moral rather than a mechanical one, for the members of the corps have distinguished themselves by their courage in facing appalling dangers, sometimes for the privilege, often for but the bare chance, of saving human life. The desirable spirit of emulation which has been created among them has been materially fostered by the generous public sentiment which is always ready to appreciate and to applaud a brave action. The expression of this appreciation, in the hands of one or two of our public spirited citizens, has taken the practical form of medals of honor, given under such circumstances that any man might covet their possession.

One of these, the Bennett medal for 1884, was recently presented to Foreman John Binns for his bravery in rescuing a lad, under particularly trying circumstances, at the burning of the St. George apartment house. Another, the Stephenson medal for 1885, was awarded at the same time to Foreman David Connor for having the best drilled and disciplined company. The presentation was made at Washington Square by Mayor Grace, and was made the occasion for an entertaining display by the life-saving corps, some of the French officers from the Isere and La Flore being among the spectators.

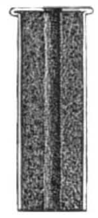
A five story apartment house, facing on the square, was selected as the theater of action. The corps displayed admirable ease and rapidity of motion in scaling the building, passing from window to window, and descending on the ropes, carrying a "rescued" comrade. Single descents from roof to pavement were made in a quarter of a minute, a very fair speed for vertical open air traveling. In ascending the ladders, some delay was noticeable from the unavoidable slipping of the feet off the rounds. This, perhaps, might have been avoided had the men worn leather stockings or moccasins instead of stiff soled boots. The method of firing a life-line over the building was also successfully shown. Similar experiments at the Palisades, it will be remembered, were illustrated in the SCIENTIFIC AMERICAN for May 23.

Though probably of less value, the part of the display which excited the most decided interest was the practical illustration of the use of the life blanket. The jump from the second story window, made by one of the corps, was comparatively a simple operation, but when made from the third story was a less enviable feat. The force generated by a body of perhaps 160 pounds weight falling through this distance is not inconsiderable, and the stretched canvas, though held by a score or more of stout, strong men, yielded almost to the point of touching the ground. A part of the performance which, presumably, is not ordinarily given, was the rebound, which sent the jumper up into the air almost to the second story again before his role was completed. The effect was quite amusing, for the figure bounding through the air in a sitting posture had a decided resemblance to "Uncle Jonathan traveling by telegraph," which used to be shown in the children's zootrope.

This easy dexterity, however, means hard work. The strong muscles and steady head result but from constant practice, and their successful proficiency comes only from daily and persevering effort.

AN ACCELERATING CARTRIDGE.

Among the very recent inventions is that of A. S. Lyman, the veteran inventor, of this city, of what may be termed an accelerating cartridge. It consists of an ordinary cartridge shell firmly packed with powder meal, through the center of which is a longitudinal perforation, as shown in the cut. Powder meal is used



in order to compact the explosive into a single piece or block, and prevent the nearly instantaneous ignition which takes place with granulated powder.

When this new cartridge is fired, the ignition begins within the walls of the perforation, slowly at first owing to the small surface exposed to fire producing a low gas pressure, by which the ball is started; but as ignition proceeds the perforation enlarges with increasing ratio, the charge burns with augmented rapidity, and the gas pressure steadily rises, expending nearly its whole effect upon the ball.

The few experiments thus far made with this novel invention have yielded remarkable results, and they indicate a coming revolution in the range and penetration of projectiles. From a small smooth bore gun, 4 feet in length, five-sixteenths inch bore, with a powder charge of nine-tenths of an ounce, made in the new form, a projectile 9 inches long, weighing 3½ ounces, has been driven into a target composed of 9 plates of boiler iron, each one-fourth inch thick.

Eight of the plates were pierced, the forward end of the projectile then curved upward, boring up within the body of the ninth plate, and making an aggregate penetration of iron by the projectile of over four inches. It is estimated by the patentee that with a three inch gun and 40 pounds of powder a projectile may be sent through a solid iron armor plate three feet thick. Should these expectations be realized by actual experiment, it would seem as if, in the naval battles of the future, the elements of light vessels, great speed, and rapid firing qualities would become prominent.

As to land defenses and military operations in general, radical changes would necessarily follow from the introduction of small arms and artillery having the extraordinary ranges and power which this new invention promises.

Car Builders Discussing Car Couplers.

At the recent annual convention of the Master Car Builders' Association, held at Old Point Comfort, Va., the question of automatic freight car couplers came up for the usual amount of discussion. There were ninety-four members present, representing railroads running nearly half a million cars, besides several railroad commissioners from the different States, who were seeking information to guide them in recommending legislation on the subject. Notwithstanding the Massachusetts law, and the tests made in Boston last fall, to promote the adoption of a uniform automatic freight car coupler, the inherent difficulties of the subject are such that but slow progress is being made toward the end sought, and any legislation by other States in the same direction seems to be of at least doubtful expediency until there can be some uniformity of opinion as to what action should be taken. The provisions of the law of New York State are different in that they apply only to new cars, as follows:

"After July 1, 1886, no couplers shall be placed upon any new freight car to be built or purchased for use, in whole or in part, upon any steam railroad in this State, unless the same can be coupled or uncoupled automatically, without the necessity of having a person guide the link, lift the pin by hand, or go between the ends of the cars."

It was urged at the convention that, to enforce the adoption of automatic couplers by legislative enactment, before some uniformity of action could be practically determined upon, would create such confusion that the danger to trainmen would be increased instead of diminished. Representatives of the Fitchburg, the Chicago and Alton, and the Lake Shore spoke favorably, though tentatively, in favor of automatic couplers they had been introducing, though the latter company had "not been going very fast," but were nevertheless "anxious to end the hazardous business of coupling with link and pin." The whole subject was finally referred to the Executive Committee, "with power to arrange for and conduct a public trial at some central point, to employ one or more experts, and to request the co-operation of the railroad companies in making trials and in furnishing the funds for conducting the same, the Executive Committee to make report of the results and to make recommendations at the next meeting of the Association."

Although the difficulties are so great in the way of selecting the best automatic coupler, it is to be noted that the most of the leading lines are gradually adopting one or another style of such coupler; there can be little doubt, however, that the movement would be general and the progress of the change rapid if all were agreed as to what was the most desirable coupler to adopt. In SCIENTIFIC AMERICAN SUPPLEMENT, No. 459, will be found illustrations and description of eight styles of automatic couplers, from among those which have thus far seemed to meet with most favor.

Typhoid Fever at Plymouth.

The following interesting account of the outbreak, progress, and cause of the dreadful fever scourge, which has abated only at intervals since last March, in a small mining town in Pennsylvania, we find in the July issue of the *Herald of Health*, published in this city. It is from the able pen of the editor, Dr. M. L. Holbrook, and teaches a lesson which should be a warning to people in many localities:

The town of Plymouth is situated favorably for health, being on a dry hillside, well exposed to wind and sun, on the banks of the famous Susquehanna River. But good air and sunshine are not always sufficient to secure good health. Like most towns of its size, it has no system of sewerage, and many of the vaults or closets are very imperfectly constructed. Every year, when the winter breaks up and the snow melts, a large amount of decaying matter which has been thrown out during the winter by the housekeepers is deposited on the ground, and pollutes both water, soil, and air. Most of the wells are shallow, owing to the peculiar geological formation of the region. These wells are generally abandoned, the houses being supplied with water by the water supply company of the place. This water is gathered into reservoirs from mountain springs and from an artesian well. It is ordinarily excellent, but liable to be polluted during freshets by surface water, which carries whatever filth it gathers from the soil in its course to the streams.

Plymouth has long suffered with typhoid fever, more or less; but between April 10, this year, and June 1 there have been over 1,000 cases. The origin of the outbreak has been investigated as carefully as could be, and, no doubt, correctly. None of those families suffered from the disease who used well water or river water, though neither were of the best quality; it was only those who used the reservoir water that contracted it. It was found that the reservoirs of mountain spring water had been polluted. It happened as follows: Between two of the reservoirs there was a farm with a house, 60 feet from a deep, narrow gully, through which a mountain stream passed to the reservoir. A farm hand employed here was taken with typhoid fever early in January, and owing to imprudence had a serious relapse, so that he was ill most of the winter. So long as the ground was frozen no harm occurred; but in March there was a thaw, and the drainage from the vault where the excrement from this sick man was thrown was washed into the stream in the gully, and soon made its way into the reservoir below. The epidemic began 13 days after the water in this reservoir was used.

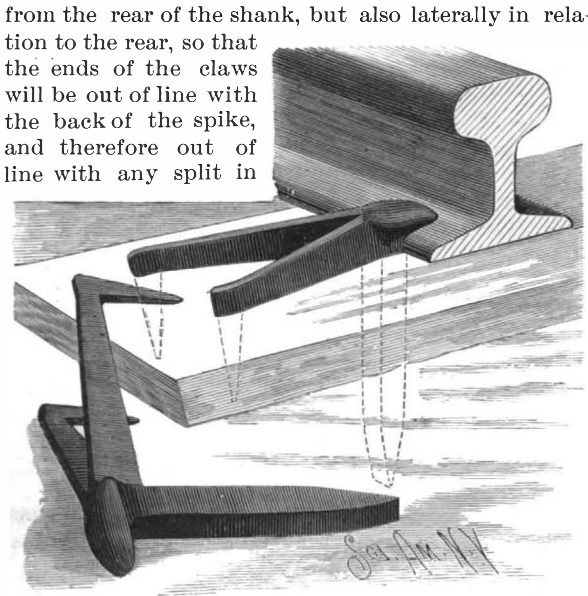
The lesson we learn from this case is, that pure water is of the greatest importance; that even pure water may become fouled without its being known to the consumer, and that those persons who have charge of patients ill with such a dangerous disease as typhoid fever may cause a great many deaths by being careless as to the disposal of the excrement. It also teaches us another lesson concerning water supply companies, and the little care they seem to give the matter of constantly watching the sources from which their water is obtained, and doing all in their power not only to prevent contamination, but to purify water which has been fouled. It suggests, too, an entire change in the method of disposing of human excrement, and the desirability of having it composted and turned into a fertilizer rather than allowing it to accumulate for months and years and breed corruption. Most of all, it proves the necessity of enlightenment on the matter of household sanitation, the danger of ignorance on these subjects, and the thoughtlessness of the majority of human beings.

The question may be asked, How was it possible for so small an amount of poison to contaminate so large a quantity of water? This is easily explained if we accept the germ theory of disease. Each germ is a seed which, under favorable conditions, multiplies rapidly. A few germs in a congenial soil become millions in a few days. In this case, the water from the melted snow carried with the germs much soluble matter into the reservoir, and this served as a food on which the germs fed and multiplied, just as weeds do in a rich garden soil.

YOUNG ostriches are warmed out of their shells by incubators in California, and manifest great astonishment when they discover they are not in an African desert. They have not yet become accustomed to being born on this continent.

RAILROAD SPIKE.

The spike herewith shown is more securely held to the tie than the old form, and consequently holds the rail more firmly; it corrects that insecure hold of the old spike caused by the splitting of the tie by the shank. To accomplish this the spike is made with two claws or anchoring arms suitably pointed to enter the sleeper, and arranged not only to extend outwardly from the rear of the shank, but also laterally in relation to the rear, so that the ends of the claws will be out of line with the back of the spike, and therefore out of line with any split in the tie which may be produced in driving. This will firmly anchor the spike, and securely hold the head on the rail in event of any looseness of the shank in its hole owing to the splitting of the wood. Such construction of the spike also provides far greater resistance to the lateral pressure of the rails and to any drawing action of the spikes. The engraving clearly shows, in the perspective view of the detached spike, the form of the shank, head, and diverging braces, and in the other view the position of the spike when applied to the tie and rail, the dotted lines representing the shank and sharpened points of the arms.

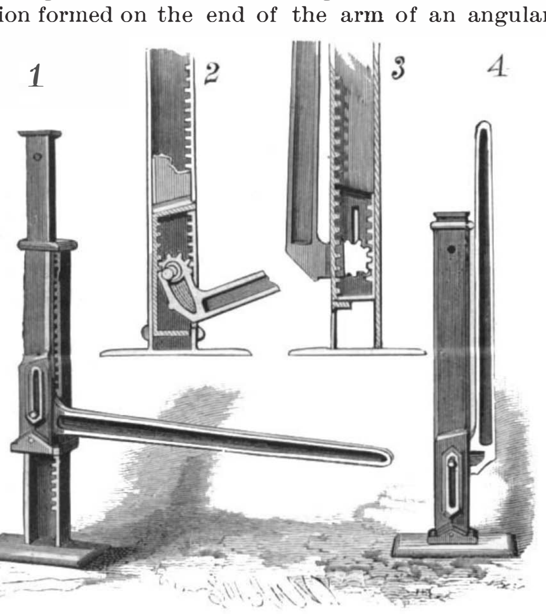


MORFORD'S RAILROAD SPIKE.

This invention has been patented by Mr. Abraham O. Morford, of Port Chester, N. Y.

IMPROVED LIFTING JACK.

Figures 1 and 4 are perspective views, and Figs. 2 and 3 are sectional elevations having the side removed to show the interior of a lifting jack recently patented by Mr. M. H. Ingalls, of North Granville, N. Y. A rack is formed on the inner surface of one of the side flanges of the standard. A flanged plate having a short rack formed on the lower part of the inner surface of one of the flanges slides between the flanges of the standard; a pinion formed on the end of the arm of an angular lever engages with this rack. A part of this pinion is so made that it can engage with the rack on the standard. In one side of the arm of the lever is a groove containing a slide, from which a pin projects through a vertical slot in the lower part of the sliding plate, which is held to slide on the standard by two bands, one secured to the top of the standard and surrounding the plate, and the other secured to the bottom of the plate and surrounding the standard.



INGALLS' IMPROVED LIFTING JACK.

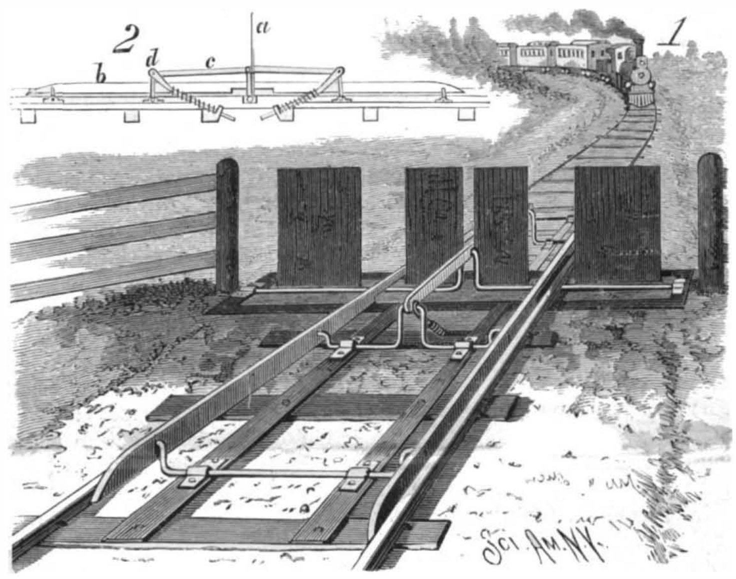
When the lever is swung up, as shown in Figs. 3 and and 4, a smooth or straight edge part of the pinion faces the rack in the standard, thus permitting the plate to be raised until its top rests against the body to be lifted. The lever is then swung down, when the pinion engages with both racks, the standard rack forming a fulcrum and the plate being raised; the slide then moves to the bottom of the groove. Fig. 1, and locks the parts in place. To lower the plate, the pin projecting from the slide through the vertical slot is raised, when the lever can be swung up to bring the straight edge part of the pinion opposite the standard rack. The jack thus constructed is easy to handle, strong and durable.

Card Board Enamel.

Take one pound of parchment cuttings, one-quarter pound of isinglass, and one-quarter pound of gum arabic in four gallons of water; boil in an iron kettle until the solution is reduced to twelve quarts; it is then removed from the fire and strained. The solution is divided into three parts of four quarts each; to the first portion is added six pounds of white lead, ground fine in water, to the second portion is added eight pounds of white lead, and to the third is added six pounds of white lead. The sheets of paper or card board are stretched out upon flat boards, and brushed over with a thin coat of the first mixture with an ordinary painter's brush; the paper is then hung up to dry for twenty-four hours. After this the paper is ready to receive a coat of the second mixture, and again hung up to dry for twenty-four hours; the paper is again treated in the same way with the third mixture, and dried for twenty-four hours. After this it receives a high gloss, which is obtained by laying the work face downward on a highly polished steel plate, and then passing both with great pressure between a pair of powerful rollers.

RAILROAD GATE.

This railroad gate—patented by Mr. Francis L. Bair, of East York, Pa.—is so constructed as to be opened by the wheels of the engine of an advancing train, and to close automatically after the passing of the train. To the ends of two of the ties, which are extended beyond the rails, are attached bearings for a central shaft carrying the plates or frames, *a*, forming the gate, which will be opened and closed by the rocking of the shaft. At the middle part of the shaft is a crank projecting in the plane of the frames; a bar, *c*, is pivoted to this crank, and also to cranks formed in shafts, *d*, journaled in bearings attached to bars secured to the ties, parallel with and at a little distance from the inner sides of the rails. Upon the ends of the shafts, *d*, are shorter cranks to which are pivoted bars, *b*, placed close to the inner sides of the rails, so that they will be in the paths of the flanges of the engine and car wheels. The ends of these bars are carried by cranks on the ends of shafts placed as shown in the engraving. The ends of the bars are beveled so that when struck by the engine wheels they will be pushed forward and downward, turning the shafts and causing the center bar, *c*, to open the gate. These bars are of such length that the gate will be opened before the engine can reach it, and that at least one pair of wheels will be always upon the bars until the entire train has passed. The gate is closed—raised—by the elasticity of springs attached to the cranks of the shafts, *d*, as shown in both figures.



BAIR'S RAILROAD GATE.

The Way Incandescent Lamps are Made and the Air Exhausted.

"The way that incandescent lamps are made is very simple," an electrician said recently. "There are different ways of preparing the filaments, which are shaped, carbonized, and treated at a white heat. They are then placed in platinum holders, which are embedded in glass, and next go into the hands of the glass blower. The glass bulbs have round openings at the bottoms and little tubes at the tops. The little tubes all connect with a big tube. This is called a fork, and resembles a cluster of blackberries. Two or three dozen bulbs may be on a fork. The glass blower places filaments in each bulb at the bottom, and welds the glass about the platinum holders to the edges of the opening. Then the air is drawn from the bulbs.

"The open end of the big tube is attached to an air pump, which has forty pounds of mercury at its top. As the mercury drops it carries all the air with it, and vacuums are created in the bulbs. The operator then takes a Bunsen burner, and directs its flame against the little tubes close to the bulbs. This closes the bulbs, which are then removed from the big tube. The glass blower finishes them off. The exhausting of the air from so many lamps at once makes the cost small. The bulbs can be made by any ordinary glass blower, but it requires a man of intelligence to make the filaments."—*Electrical Review.*

Common Soap.

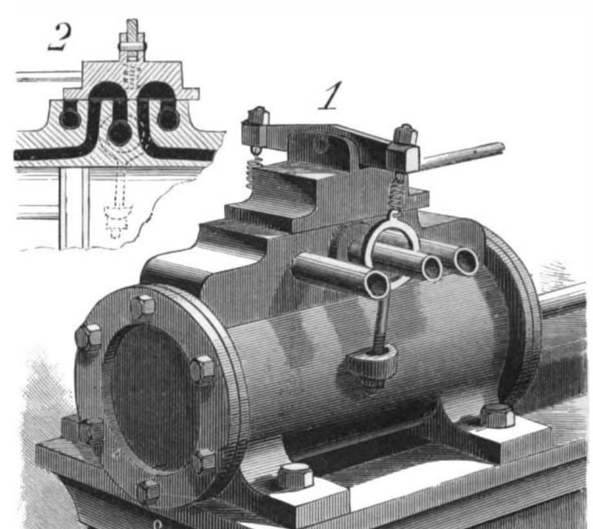
Manufacturers doing a large business have kettles holding several thousand pounds. The ingredients of ordinary family soap are, primarily, grease or tallow, rosin, soda ash, and salt. They are boiled for a couple of days, and then allowed to cool for about three days. The soap is then pumped from near the bottom of the kettle—this is because the soap in the bottom cools more quickly than at the top—and into a crutcher, nearly like a milk churn, where it is mixed thoroughly. In this crutcher most of the adulteration commonly used in soap is introduced. Among the materials put into the soap are marble dust, glucose, sal soda, which is not used so much to cheapen the soap as to improve its appearance, flour, and starch. From the crutcher the soap is run into boxes called frames, and is cut into bars when it becomes hard. It takes about two weeks from the time the material is put in the kettle to the time the bars are placed in boxes ready for the market. One-third of the weight of a bar of soap when boxed is water.

This will dry out in course of time, leaving a three pound bar weighing only two pounds. Rosin is used in almost all soap, but is absolutely without use except to make the cost less to the manufacturers. This is also true of all the ingredients in soap, except the fatty substance and the ash. Yet the wastefulness of the persons who do washing makes it an absolute saving to the consumer to have three-quarters of it adulteration.—*Laundry Gazette.*

BALANCED SLIDE VALVE.

The valve has two cavities in its face, arranged one in advance of the other, which as the valve is reciprocated alternately open the steam and exhaust passages leading from the opposite ends of the cylinder. The valve seat has five ports—a central port connecting with a steam pipe or inlet, one port at each side of the central one, and an exhaust port at each end. As the valve is moved backward and forward over these ports, the cavities in it will distribute steam to, and exhaust it from, opposite ends of the cylinder alternately; the routes of the live and exhaust steam during any position of the valve will be understood from Fig. 2, a longitudinal section through the cylinder and valve. The valve may be operated by an eccentric set as in ordinary engines.

The valve requires no steam chest, and is held to its seat by spiral springs arranged on opposite sides of the valve and connected at one end to the ends of a cross-bar pivoted at, and extending across, the center of the valve; the other end of each spring has an adjusting screw bolt connecting with the sides of the cylinder, as shown in Fig. 1. By this construction the valve



WETHERILL'S BALANCED SLIDE VALVE.

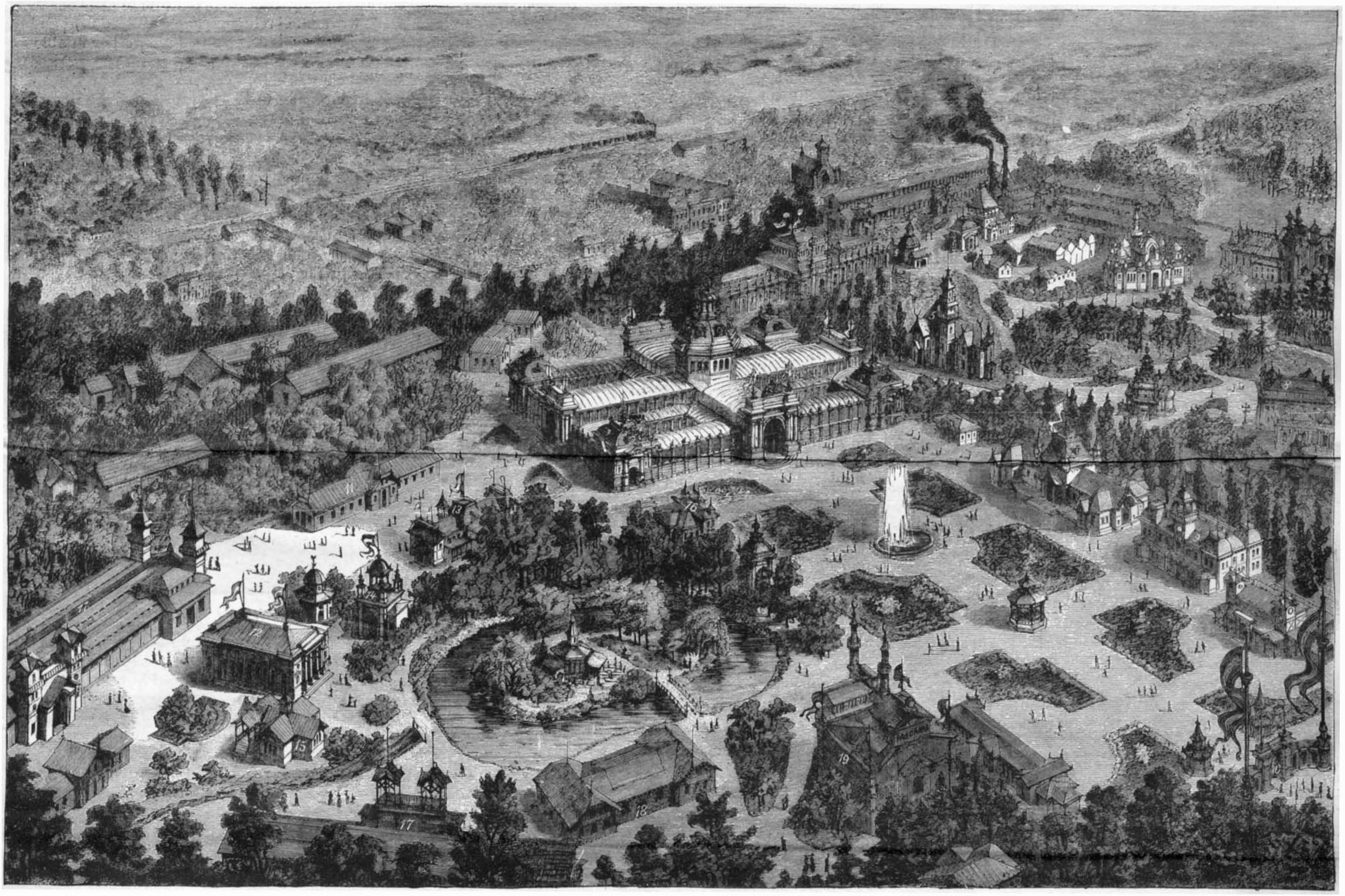
may be balanced, or nearly balanced, against varying steam pressure, and as there is no chest to conceal the valve, its condition as to tightness may always be seen.

This invention has been patented by Mr. C. P. Wetherill, of Woodville, Miss.

THE EXPOSITION AT BUDAPESTH.

About forty years ago, the first exposition was opened in Hungary, and it was found an excellent means for improving the industries of the country. In 1872, 1876, and 1879, smaller expositions were opened in towns in the several provinces, and as these were all successful, a plan for a large exposition for the entire country, to be held at the capital, Budapesth, was matured. The buildings were erected in a part of the city park.

As shown in the annexed cut taken from the *Illustrirte Zeitung*, a large wooden portal leads into the enclosure containing the buildings. The Industrial Hall, which was erected as a permanent structure, and not for this exposition only, is surmounted by a large and elegant dome. The metal, glass, clay, and porcelain industries, the textile branches, furniture, the graphic arts, sugar manufacture, and chemical industries are exhibited in this building; 127,937 persons are now occupied, in Hungary, in the manufacture of leather, and this branch of industry was well represented; 30 per cent of the cultivated lands of Hungary are woodlands, kept in order by a small army of foresters and huntsmen. Their appliances and tools, different kinds of woods, etc., were also exhibited.



THE BUILDINGS IN THE EXHIBITION AT BUDAPESTH.

1. Industrial Hall. 2. Large Machinery Hall. 3. International Machinery Hall. 4. Oriental Pavilion. 5. Forestry Pavilion. 6. Pavilion of the City of Budapesth. 7. King's Pavilion. 8. Art Building. 9. Directors' Building. 10. Main Entrance. 11. Agricultural Halls. 12. Building of the Secretary of the Treasury. 13. Wine Producers' Building. 14. Building for Horses. 15. Department of Worship and Education. 16. Model Hotel. 17. Building for Educational Appliances. 18. Building for Home Industries. 19. Panorama.

The pavilion of hygiene contained plans and models of schools, hospitals, etc., and samples of the different mineral waters of Hungary.

As Hungary is a great agricultural country, its products and the machines and tools for tilling the land, etc., were well represented in Agricultural Hall.

Eleven buildings were provided for the exhibition of animals, which number is by no means too large, as we will see when we take into consideration the fact that there are in Hungary 1,819,508 horses, 3,597,543 cows and oxen, 9,252,133 sheep, and 236,352 goats. In the latter part of May a special exhibition of sheep took place, in which 2,012 animals were exhibited, which is a greater number than was ever collected for a similar purpose heretofore.

Torpedo Boats.

A new classification of torpedo boats has been adopted in the French Navy: First, torpedo cruisers, with a displacement of from 1,240 to 1,260 tons; second, torpedo dispatch boats, of from 320 to 380 tons; third, sea going torpedo boats, of 50 tons and over; fourth, coast defense torpedo boats, which are divided into two classes, those of 50 tons and those of 25 tons. In addition to these are the vedettes, torpedo boats which have less than 25 tons, but which, it is expected, will be of great service in the way of protecting the coast in the event of war. The *Illustration* of May 24 gives a sketch of the Bombe, belonging to the second class, which has just been constructed at Havre by a private firm, which has built two similar vessels for the Ottoman Government. The French will soon possess eight torpedo cruisers similar to the Bombe—the Coulevrine, the Dague, the Dragonne, the Fleche, the Lance, the Salve, and the Sainte-Barbe. The Bombe is built entirely of steel, is 30 meters long, her greatest breadth of beam being 6 meters 60 c. She is driven by 2 engines, steams about 18 knots an hour, and is provided with electric lights and all the latest improvements for firing torpedoes.

Large squadrons have this year been commissioned for the Russian naval exercises, in which the whole torpedo boat fleet will take part. The latter, to the number of eighty, will be divided into five smaller flotillas of 16 boats each. They are to cruise along the north shore of the Gulf of Finland, and will be commanded by Admirals Pilkin and Kuprianoff. The rest of the torpedo boats will remain at Cronstadt. The ironclads will take up positions from Cronstadt along the coast, and the naval maneuvers, which have just begun, will extend as far as Bjorkesund.

The *Army and Navy Gazette* says: "Within the past few days all the daily papers have contained glowing accounts of the results obtained by the newly invented Brennan torpedo, official trials of which were recently made at Sheerness. These reports will cause amusement to the initiated; but as they seem to be issued with some authority, and mention that sums ranging in amount from £10,000 to $100,000 are to be paid for the invention, it is perhaps as well that it should be pointed out that this weapon is not altogether faultless, and that certain of the statements made about it are erroneous. It has never run 50 miles an hour. It has never been run among shipping in the sense that it has been steered in and out and around them. In fact, we doubt if it can be steered more than just sufficient to keep a straight course. But perhaps its greatest fault is that it can only be worked from a fixed point, as it requires a special engine, and that, therefore, the hostile ship must *come to it*. For these reasons it is probable that the best attainable controllable torpedo is not to be found in the Brennan. The Brennan is thus described: the torpedo is ejected from the fort by means of a steam engine, at a velocity estimated at 50 miles an hour. There are within the machine two coils of wire wound on spindles, each connected with the shafting of a screw propeller. The ends of these wires are made fast to drums on the steam engine within the fort, and as the wires are unwound from the reels in the torpedo on to those on the engine, the screws are set revolving, and the weapon propelled forward. The steering is effected by hauling harder on one side or other of the wires, so as to make the respective screw revolve faster. Lights screened from the front are placed to show to those on the fort the position of the torpedo."

Russian Torpedo Boats.

The Russian naval maneuvers will take place this year in the Baltic about the end of this month. There will be five flotillas of sixteen torpedo boats each, in all eighty boats. The squadron of ironclads will take up positions partly in Cronstadt Roads and partly before the entry to the coast Archipelago of Finland. The Peter the Great and the frigate Dimitri Donskoi will cruise near the port of Reval.

One of the Evils of Natural Gas.

The legal papers in a nuisance suit against the Penn Fuel Gas Company, the largest natural gas company of this locality, will be filed to-morrow by M. Woodward, attorney for William Metcalf and other residents of Cliff and Fulton Streets. For several weeks this gas company has been blowing off its surplus gas on the hill overlooking the Union Depot. At night the gas is lit, and the roaring, together with the light and heat, has so annoyed the neighboring residents that they will ask the courts to declare it a nuisance. They say that they cannot sleep, and the glare from the light is intolerable. The company answers that it must have an escape for the gas.—*Phila. Press.*

Indelible Stamping Ink.

For an indelible stamping ink, M. E. Johanson, of St. Petersburg, gives the following for marking textile materials by a stamp: 22 parts of carbonate of soda are dissolved in 85 parts of glycerine, and triturated with 20 parts gum arabic; in a small flask are dissolved 11 parts of nitrate of silver in 20 parts of officinal water of ammonia. The two solutions are then mixed and heated to boiling. After the liquid has acquired a dark color, 10 parts of Venetian turpentine are stirred into it. The quantity of glycerine may be varied to suit the size of the letters. After stamping expose to the fire, or apply a hot iron.

Mineral Products of the United States in 1884.

The second report on "The Mineral Resources of the United States," by Albert Williams, Jr., Chief of the Division of Mining Statistics and Technology, United States Geological Survey, is now in press, and will be issued shortly. This report is for the calendar years 1883 and 1884, and contains detailed statistics for these periods, and also for preceding years, together with much descriptive and technical matter. The following are the totals of the production of the more important mineral substances in 1884:

	Quantity.	Value.
Pig iron, long tons, spot value..	4,097,868	$73,761,624
Silver, troy ounces, coining value....... ...	37,744,605	48,800,000
Gold troy ounces, coining value	1,489,949	30,800,000
Copper, pounds, value at New York city (*a*).	145,221,934	17,789,687
Lead, short tons, value at New York city ...	139,897	10,537,042
Zinc, short tons, value at New York city....	38,544	3,422,707
Quicksilver, flasks, value at San Francisco..	31,913	936,327
Nickel, pounds, value at Philadelphia (*b*)...	64,550	48,412
Aluminum, troy ounces, value at Philadelphia..................	1,800	1,350
Platinum, troy ounces, value crude at New York city	150	450
Total..	....	186,097,599

a Including copper made from imported pyrites.
b Including nickel in copper nickel alloy.

NON-METALLIC MINERAL PRODUCTS OF THE UNITED STATES IN 1884 (SPOT VALUES).

	Quantity.	Value.
Bituminous coal, brown coal, lignite, and anthracite mined elsewhere than in Pennsylvania ....long tons (*a*)..	73,730,539	$77,417,066
Pennsylvania anthracite...........do (*b*) ...	33,175,756	66,351,512
Petroleum........ ....barrels..	24,089,758	20,476,294
Building stone............	....	19,000,000
Lime ....barrels..	37,000,000	18,500 000
Salt........................... .do....	6,514,937	4,197,734
Cement ....do....	4,000,000	3,720,000
South Carolina phosphate rock.long tons(*c*)..	431,779	2,374,784
Limestone for iron flux..............do.. .	3,401,930	1,700,965
Mineral waters ....gallons sold..	68,720,936	1,665,490
Natural gas..	....	1,460,000
Zinc white .... short tons..	13,000	910,000
Concentrated borax.......... ....pounds..	7,000,000	490,000
New Jersey marls..... ....short tons..	875,000	437,500
Mica...................... .....pounds..	147,410	368,525
Pyrites............. .... .long tons..	35,000	175,000
Gold quartz souvenirs, jewelry, etc.........	....	140,000
Manganese ore..................long tons..	10,000	120, 000
Crude barytes........... ....do ...	25,000	100,000
Ocher ....do....	7,000	84,000
Precious stones.................	....	82,975
Bromine.......... ....pounds..	281,000	67,464
Feldspar... ....long tons..	10,900	55,112
Chrome iron ore......................do....	2,000	35,000
Asbestos.................. ...short tons..	1,0	30,000
Slate ground as a pigment.......long tons..	2,000	20,000
Sulphur ....short tons..	500	12,000
Asphaltum............ ....do....	3,000	10,500
Cobalt oxide................... ...pounds..	2,000	5,100
Total	....	$220,007,021

a The commercial product, that is, the amount marketed, was only 66,875,772 tons, worth $70,219,561. *b* The commercial product, that is, the amount marketed, was only 30,718,293 tons, worth $61,436,586. *c* Year ending May 31.

RESUME OF THE VALUES OF THE METALLIC AND NON-METALLIC MINERAL SUBSTANCES PRODUCED IN THE UNITED STATES IN 1884.

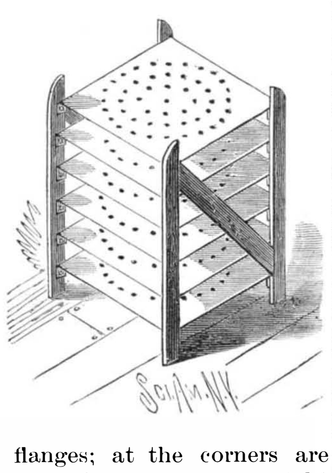
Metals..	$186,097,599
Mineral substances named in the foregoing table ...	220,007,021
	$406,104,620
Fire clay, kaolin, potter's clay, common brick clay, terra cotta, building sand, glass sand, limestone used as flux in lead smelting, limestone in glass making, iron ore used as flux in lead smelting, marls (other than New Jersey), gypsum, tin ore, antimony, iridosmine, millbuhrstone and stone for making grindstones, novaculite, corundum, lithographic stone, talc, and soapstone, quartz, fluorspar, nitrate of soda, carbonate of soda, sulphate of soda, native alum, ozocerite, mineral soap, strontia, infusorial earth and tripoli, pumice stone, sienna, umber, etc., certainly not less than............	7,000,000
Grand total	$413,104,620

Asphaltum.

As a building material, says a contemporary, asphaltum is fast growing in popular favor, and is used principally as a prevention against damp cellar walls and mason work under ground, water tight cellar floors, coating for rainwater cisterns, covering for underground vaults, etc. Its efficiency is fairly proved upon the first trial if applied properly. It has no equal for the purpose we have named, and needs only fairly to be introduced to make its own lasting reputation for reliability. The usual method of applying it is as follows: Reduce to a semi-liquid state, in an iron pot as large as can conveniently be obtained, over a good fire, sufficient asphalt to about two-thirds fill it. Use caution that the flame does not rise over the top of the pot to ignite the asphalt. Have the wall as nearly dry as possible and the joints somewhat rough—not smooth pointed—to admit of the asphalt penetrating the pores and securing a hold. Cover the wall with the asphalt, applied with a long handled brush, while the material is hot, and brush it in well. The asphalt will cool readily when applied to the cold surface of the wall. It is all-sufficient if the masonwork is thoroughly covered, for a coating ½ inch thick is as perfect a protection as a thicker one. On the roofs of vaults, tops of cisterns, or the like, where a settlement is likely to occur and produce rupture, mix a little air-slaked lime or clean, fine sand with the sand while hot. This will tend to preserve its proper elasticity, and destroy its brittleness and liability to fracture. For vault coverings, or floors to cellars, basements, etc., the coating should be about ½ inch thick, and thoroughly worked into the joints and smoothed with a trowel. A barrel of asphalt as found in the market, heated and applied to vertical brick walls as we have described, will ordinarily cover about 250 square feet of surface, and in point of cost compare favorably with other methods of damp proofing, and produces better and more lasting results.

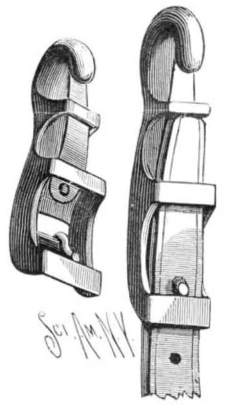
PIE AND CAKE RACK.

The pie and cake rack shown in the engraving consists of shelves made with or without perforations, and supported by a frame of upright and bracing slats. The frame is made of four corner upright wood slats united at three sides of the rack by diagonal braces, leaving one side of the rack open to allow access to the shelves, which are about ten inches square, and made of tin or sheet metal of suitable stiffness to support the pies and cakes. The edges of the metal sheets are doubled against the main bodies of the sheets, thus forming four stiffening lips or flanges; at the corners are formed lugs, by bending the ends of the edges at right angles to the plates, by which the shelves are nailed or screwed to the uprights. This rack will be found very useful to housekeepers and others when baking, as the pies may be transferred at once from the baking plates to the shelves, where they will be held in small space, thus saving much room. This invention has been patented by Mrs. Lydia A. Rowe and Mr. D. S. Rowe; particulars can be obtained by addressing the former, 121 Clifton St., Springfield, Ohio.



IMPROVED SNAP HOOK.

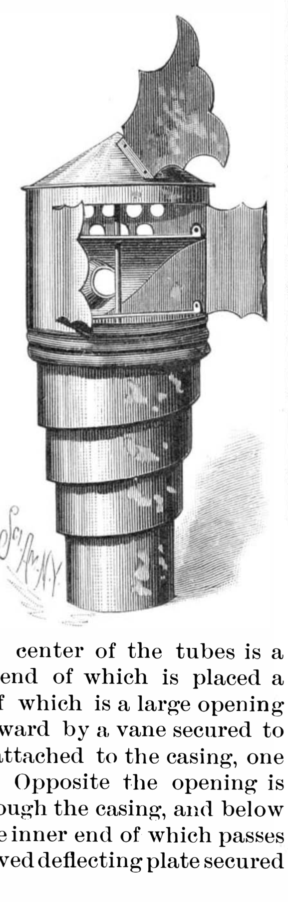
This snap hook may be applied to straps without stitching, thus effecting a saving in leather stock and enabling any person to attach a snap hook to a strap in a very short time. The hook and spring tongue are of the ordinary construction, but the spring is protected by a cross piece, so that it cannot be accidentally pressed down to release the object held in the hook. At the back end of the snap hook is a buckle to receive the strap and in front of the buckle is a loop or keeper to hold the end of the strap. The tongue of the buckle is placed upon a rod held in the frame below and somewhat in front of the cross piece of the buckle. The loop or keeper being in a line with the buckle plate, the strap will be straight and smooth when attached.



This invention has been patented by Mr. Dennis W. Palmer, of Detroit, Maine.

CHIMNEY COWL.

The engraving shows a chimney cowl or cap which is very effective in preventing draughts from blowing down the chimney, and in keeping out rain and snow, while it increases and regulates the draught. The lower part consists of a series of tubes of different diameters formed with inclined edges and secured together one above the other by clips, the smallest being at the bottom to enter the chimney. The tubes are so held by the clips as to form passages to permit any draughts or currents of air that may blow down the cowl to pass out without entering or materially obstructing the draught of the chimney. Held in cross pieces in the center of the tubes is a standard, upon the upper end of which is placed a revolving top, at one side of which is a large opening which is always kept to leeward by a vane secured to the dome, and side wings attached to the casing, one at each side of the opening. Opposite the opening is formed a series of holes through the casing, and below these is secured a funnel, the inner end of which passes through an opening in a curved deflecting plate secured inside of the cap, so that air entering the funnel will be directed through the cap to the large opening, and air entering the holes will be directed, by the upper surface of the curved plate, also to the opening. At the base of the dome is a horizontal plate, and secured in a diagonal position above the opening is a plate which acts to direct the air downward to the opening.



This invention has been patented by Mr. Ira G. Lane, of 207 E. 64th St., New York city.

Color Blindness.

Color blindness, like other defects of vision, affects people in different degrees of intensity, and, like myopia, or short sight, it is frequently hereditary. It often becomes more pronounced in after life, or when the near point of vision begins to recede.

Among the more highly educated of all nationalities the average number of color blind is 4 per cent, an average in excess of that of all other classes A man may have a good eye for form and outline, and yet be partially or wholly color blind. To select an instance from among many is difficult, but one impresses me more than the rest—that of Wyatt, the sculptor, who at the outset of his career was known as a remarkably good draughtsman. He naturally took to painting, but, as his pictures were observed to present curious incongruities of color, that involved him in grievous difficulties, he with much reluctance was obliged to abandon the brush for the chisel. He was altogether unable to comprehend the nature of his defect—indeed, refused to believe that he was color blind. So of men who have attained to eminence in the world of letters, and whose writings unmistakably betray evidences of a meager color vocabulary. A striking example of this occurred in the person of Angus B. Reach.

He was unable to recognize a difference in color between the leaf, the flower, and the fruit of plants and trees. His want of perception of color was wholly unknown to and unrecognized by himself, until we sat together at the table of a Paris restaurant. He, wishing to finish his letter to the "Chronicle" newspaper, requested the waiter to bring him some ink. As it often happens, under similar circumstances, the ink was brought in a wineglass. Reach became absorbed in his subject, while I, seated opposite to him, observed him alternately dipping his pen into his claret glass and into the ink glass. I frequently checked him, but presently to my surprise he took up the ink glass and was about to drink, when I remonstrated, and he then said he could see no difference between the color of the ink and the wine. On subsequently testing him I discovered that he was completely color blind.

Homer certainly labored under a physical defect of vision, and this fully explains the limited use of the terms he employed to express his sense of color, and to which Mr. Gladstone has drawn attention.—*Jour. of Science.*

Cotton and its Machinery.

The fly shuttle, or "picking peg," was invented in 1738, by John Kay, and the drop box by Robert Kay, in 1760. A machine for spinning by rollers was invented by John Wyatt, and patented by Louis Paul, in 1738. In 1769, Arkwright patented his water frame. James Hargreaves invented his spinning jenny in 1770; while a few years after, Samuel Crompton united the principles of Hargreave's jenny and Arkwright's water frame, and gave to the world the mule spinning frame.

It was about 1790 when the improved steam engine of James Watt was successfully applied to cotton machinery. The power loom was invented by Dr. Cartwright in 1785. The headstock was placed in the center of the mule by Wright, while Richard Roberts about 1825 achieved an enormous step in advance by his invention of the self-acting mule. The Jacquard loom was invented by Jacquard, of Lyons, in 1801. The dead spindle was of American origin in 1831. The combing machine for cotton was invented by Heilmann, of Mulhouse, in 1846—adapted from his wool combing machine. The Whitney cotton gin was patented in 1794, which set aside the labor of two hundred and ninety-nine men out of every three hundred, in separating the seeds from cotton.

The first we hear tell of cotton being exported to England from the United States was in 1770, when three bags from New York, four bags from Virginia and Maryland, three barrels from North Carolina, and three bags from Georgia were received in the port of Liverpool. In 1784, eight bags of cotton were imported into Liverpool from the United States, and a blundering custom house official detained them, as he was confident they had not been grown in America. They were consigned to the firm of William Rathbone & Son, who for several months were unable to find buyers; but eventually disposed of them to the Strutts, of Derby. The cotton imported into England from America in 1883 was 3,222,000 bales of four hundred pounds each.—*Wade's Fiber.*

To disguise the odor of iodoform, Mr. P. E. Smith, of Pinckneyville, Ill., states (*Nat. Drug.*) that the best oil of lavender will almost if not entirely disguise the odor of iodoform.

THE COLOSSAL ELEPHANT OF CONEY ISLAND.

(*Continued from first page*).

an observatory. The elephant is constructed of wood throughout, and is covered with sheet tin. The total length from the trough to the back part of the hind legs is 150 feet. The platform of the howdah is 88 feet from the ground, and the total height to top of crescent on flag pole is 150 feet. The height from ground to body, when standing immediately underneath, is 24 feet. The legs are 18 feet in diameter, and the two hind legs are provided with circular stairways leading to and from the rooms above.

The first room reached in passing up the stairs is termed the stomach room, and is dignified with this title, not because it is provided with the wherewithal to cheer the inner man, but owing to its special location in the body of the beast. The different rooms in the animal are likewise christened after their particular location, as the thigh room, brain room, hip room, etc. The grand hall, or auditorium, is reached upon ascending the stairs, and this is found to be very spacious and airy, the ceiling being very high and slightly dome shaped. A gallery passes all around the hall. At the further end of it a flight of steps leads to what forms, in fact, a continuation of the main hall, only on a higher plane. The main hall is 80 feet long and 32 feet wide, while the upper part of the main hall is 36 feet long and triangular in shape. There are 34 rooms in the structure in all, which are located principally between the walls of the hall and the outer walls of the structure. Most of them are quite small, and are very extraordinary in shape, their walls conforming to the shape without of that particular section of the colossus. The eyes, which form the windows of two of these rooms, are 4 feet in diameter. The tusks are 36 feet long and 5 feet 8 inches in diameter.

In laying the foundation of the structure the builders met with some difficulty, owing to the instability of the soil, it being simply a sandy beach. Piles were driven to a great depth, and a solid platform was raised on top of the piles and secured firmly thereon. A second platform, which was designed to bear the direct weight of the colossus was constructed above this, and was supported on vertical timbers strengthened by inclined braces reaching to the platform, with a view of resisting great lateral as well as vertical strains.

After the foundations were completed, work was commenced upon the visible portion of the building, the legs being the first point of attack. Yellow pine posts 12 x 16 inches were first raised above the platform, and being bolted to the flooring beneath were made self-supporting. Two posts 42 feet long were thus raised in each leg, and 12 smaller timbers placed in a circle so as to inclose the main posts were also bolted to the platform in a similar manner to form the outer wall of the leg. These timbers were joined at the top by connecting beams.

Cranes were mounted on the platforms thus formed, to which the material was raised as the work progressed. The difficulties increased, however, with the work, and it became necessary to secure the services of the most skilled workmen. Not only was this so on account of the dizzy height that the structure attained, but to the necessity of conforming the construction to the peculiar emergencies that arose, it being requisite to form nearly all the parts on the spot under the immediate personal supervision of the architect. The weight of the structure is carried, as may be seen by the engraving, by five supports, the four legs and the trunk.

Commencing at what is now the flooring of the main hall, trusses were raised on each side and at the two ends of the hall, and these trusses (the bottom chords corresponding with the floor and the top chords with the ceiling of the hall) constitute the principal support of the ribs. It will be seen from this that what might be termed an immense box girder was formed, the ends of which are supported by the front and hind legs respectively.

The ribs weigh directly upon the upper chords at the four corners, but at other points the ribs bear away from the chords, owing to the enlargement of the body under the howdah. At these points it was necessary to extend the vertical and horizontal members of each truss from the wall and ceiling until they intersected with ribs. In addition to this, an arched rib corresponding to the backbone is carried from the main support of the hind legs to the neck of the monster, where it bears indirectly upon the vertical support of the front legs. The ribs in the body of the colossus are 40 in number, and each consists of six sections bolted firmly together. As they serve to give consistency and rigidity to the whole structure, they form an important element in its construction. They are about seven inches in width, and are placed two feet apart, measuring from center to center. The head framing is similar in general construction to that of the body, and is supported by the trunk and forward supports of the front legs. It is provided with twelve ribs. Great difficulty was experienced in raising the ears and adjusting them in position in the head. This was principally due to their enormous weight, some six tons each, and the great height to which they had to be raised and the difficulty of securing such an enormous mass securely to the drums which had been prepared to receive them in each side of the head. In addition to being bolted firmly in position at these points, iron rods were extended from the main trusses within through the ears at two points below the drum. The ears are some 34 feet long by 20 feet wide.

The architect depends upon the enormous weight of the elephant and upon iron rods that pass from the trusses above, through the legs, and connect with the foundation platform, to hold the colossus in its position. He has kindly furnished us with a few statistics that may be of interest. The colossus, he informs us, weighs about 100,000 tons. It contains 1,500,000 square feet of timber, and 700 kegs of nails were consumed in its construction. In addition to this, 7 tons of bolts were disposed of, and it required 35,000 square feet of tin to cover its surface. In size it compares favorably with many of the large hotels and other structures in its neighborhood, and some idea of its magnitude may be had by comparing it with Jumbo, which is drawn in scale by its side, and which would find plenty of room for a promenade within one of the legs of the colossus.

The Fastest British Cruiser.

The fastest cruiser is the Mercury, and we are right, says *Iron*, in saying that she is the fastest full-sized ship afloat. The vessel has attained an average speed of over 18½ knots, or 21·275 miles, an hour, and thus surpasses by half a knot the Chilian ram cruiser Esmeralda (18 knots) and the French cruiser Milan (also 18 knots, launched in 1884), as well as the Phaeton and the Iris, the latter her sister ship, but launched a year before her (in 1877). As the Mercury is 300 feet long and 46 feet in breadth, with a draught of water of 22 feet, this is an exceedingly high speed for so large a vessel. She and the Iris thus stand unrivaled as regards speed by any vessel of their size; the Esmeralda being only 277 feet in length, while the French vessel has a length of 303 feet, but a beam of only 33 feet. An authority on these matters says of the English cruisers that they are the first of a new type designed for high speed as the pre-eminent requisite. All other requirements have been subordinated to this important element. They present a beautifully sharp bow and long, exceptionally clean run, and are altogether admirable specimens of a design for a swift and lightly sparred vessel. They are special screw dispatch ships, and are unarmored, of course; the Mercury, which is to join Admiral Hornby's squadron, has an armament of 10 64-pounders. She is built of steel, and in proportion to her tonnage has been one of the most costly vessels afloat. Her hull and machinery cost altogether somewhere about £199,000, almost $1,000,000, or within £10,000 or £15,000 of the Iris, which has been said to be as costly per ton as the ironclad Inflexible. Notwithstanding what has been written and stated to the contrary, the above statement shows that England still stands in the front rank as regards naval construction. Those who affirm the contrary should at least take the trouble of scanning the official navy lists of other maritime powers, when they will find—to their astonishment, probably—how rashly they have made assertions they are unable to substantiate.

Black Enamel for Iron Goods.

For the last few years, says the *Genie Civil*, it has been sought by different processes and various material, to protect iron and give it a brilliant black coating. These attempts have not been very successful; the coating being generally not sufficiently elastic, and peeling off too rapidly under the the influences of changes of temperature. M. Puscher, of Nuremburg, has described a very simple process whereby he claims to cover iron and any other metals with a black coating similar to enamel, and very much more equal in thickness and regularly distributed, as it is not laid upon the metal with a brush or any similar tool. M. Puscher places in a vase about 18 inches high sufficient finely powdered coal to cover the bottom of the vessel to a depth of about ¾ inch; and over this at a height of about one inch, is placed a grating which carries the objects to be treated. The vessel is then covered and luted down tightly, and placed upon a brisk fire. The vessel is at once filled with steam, which soon evaporates and is then charged with bituminous vapor. The firing is maintained for about half an hour, so that the bottom of the vessel is kept at dull red heat; after which it is removed, and when cool opened. The remainder of the coal is found in the form of coke; and the objects placed upon the grating, which have been at a fairly high temperature for a considerable time, are found to be covered with a black coating having all the appearances of enamel, but of extreme tenacity and a considerable degree of elasticity. Objects thus treated may be bent and exposed to great variations of temperature, without in the least affecting the coating deposited on their surfaces. It is, in fact, a simple process for stove blacking iron goods, and possesses the advantages and drawbacks of this method of treating metallic surfaces. In any case it is a cheaper and, on the whole, more effective process than dipping, which is so largely practiced with cheap iron articles.

Correspondence.

To the Editor of the Scientific American:

In your article on the Herreshoff yacht Stiletto, you state that there are now building by Yarrow two torpedo boats expected to run 24 knots an hour. Taking the figures of the Stiletto, 6⅛ feet pitch, with 450 turns of screw per minute, it does not need much calculation to show that with an allowance of 10 per cent slip (which is ample) the Stiletto is capable of doing much better than is claimed for the Yarrow boats. Please make a calculation, and see if on the above basis the Stiletto should not have a speed of 29$\frac{13}{16}$ statute miles an hour. In nautical miles the reduction would be as 60 nautical is to 69½ statute miles.

J. B. H.

New York, June 18, 1885.

[The slip amounts to 20 per cent. With the above figures this gives a speed of 26$\frac{12}{16}$ miles per hour.]

Fertilization of Red Clover by Bees.

To the Editor of the Scientific American:

I notice a corespondent of your paper says that honey bees do not fertilize red clover blossoms. They are often very busy working on red clover, especially the Cyprians and Italians, and why do they not fertilize it? They may get honey too far from the base of the tube, while the bumble bee's tongue reaches to the base. If the scarcity of bumble bees accounts for the lack of seed on the first crop of clover, why not cultivate and domesticate the bumble bee, and winter them so as to have enough of them to fertilize the first crop? It would certainly be advantageous to the hay, also seed the ground by shattering.

We need not cultivate bumble bees if we could find some other insect that would answer the purpose, and one that would combine some other points of usefulness would be preferable, but clover seed in first crop is a prize worth some labor to secure, is it not?

[A valued correspondent, who is an experienced agriculturist, to whom the foregoing was submitted, gives the following reply: Italian bees and some other varieties of honey bees gather some honey from red clover blossoms, when the secretion of honey is profuse, but no race of bees has yet been introduced or produced having a tongue of sufficient length to *exhaust* the honey secretion from red clover blossoms. The honey gathered from red clover is of superior quality and very fine color.

The fact that not more than one-fifth of the first crop of red clover blossoms contains seed seems to prove that honey bees do not fertilize that variety of flora.

This failure probably results from the insufficient length of the ligula in honey bees to properly deposit the fecundating pollen.

May it not, in a measure, be due to some singularity of the form of the pistils) which may only be entered by the longer and stronger ligula of the bumble bee?

It would also appear that the fertilization of red clover blossoms is chiefly, if not wholly, performed by bumble bees.

Darwin, in his "Origin of Species," alluding to this fact, says: "We may infer as highly probable that were the whole genus of humble bees to become extinct or very rare in England, the hearts-ease and red clover—which they fertilize by carrying pollen from flower to flower—would become very rare or wholly disappear."

The cultivation of red clover was not successful in Australia until after the importation of bumble bees to that country.

In suggesting the cultivation and domestication of the bumble bee, in order that a sufficient number may be present in time to fertilize the first crop of red clover, the correspondent introduces a subject full of interest and stings, particularly stings. He also apparently overlooks the fact that the bumble bee belongs to the solitary species, and, as is the case with the wasp, ordinarily only the queen survives the winter.

The partial domestication of the bumble bee, even to the extent of furnishing warm winter quarters and the stimulation of early breeding, would be attended with such difficulty that economy would suggest that the matter be left entirely to nature.]

Clearing of Water Mains by Chemicals.

At Leipzig, last year, the pipes experimented upon were those conveying water from the pumping station to the town reservoir. This main is about 15½ inches in diameter, and 2 miles 1,444 yards long; and the incrustation was from one-half to 1 inch thick, and in some places still thicker. The operations lasted more than nine weeks; and during that period, at intervals, the pipe was filled with dilute hydrochloric acid eight times, with soda solution three times, and with a solution of chloride of lime once (being washed out thoroughly with water, between the successive applications). It is stated that the incrustation was entirely removed; the practical effect of the cleaning being indicated by pressure gauge—a decrease of from 1·8 to 2 atmospheres pressure at the pumps.

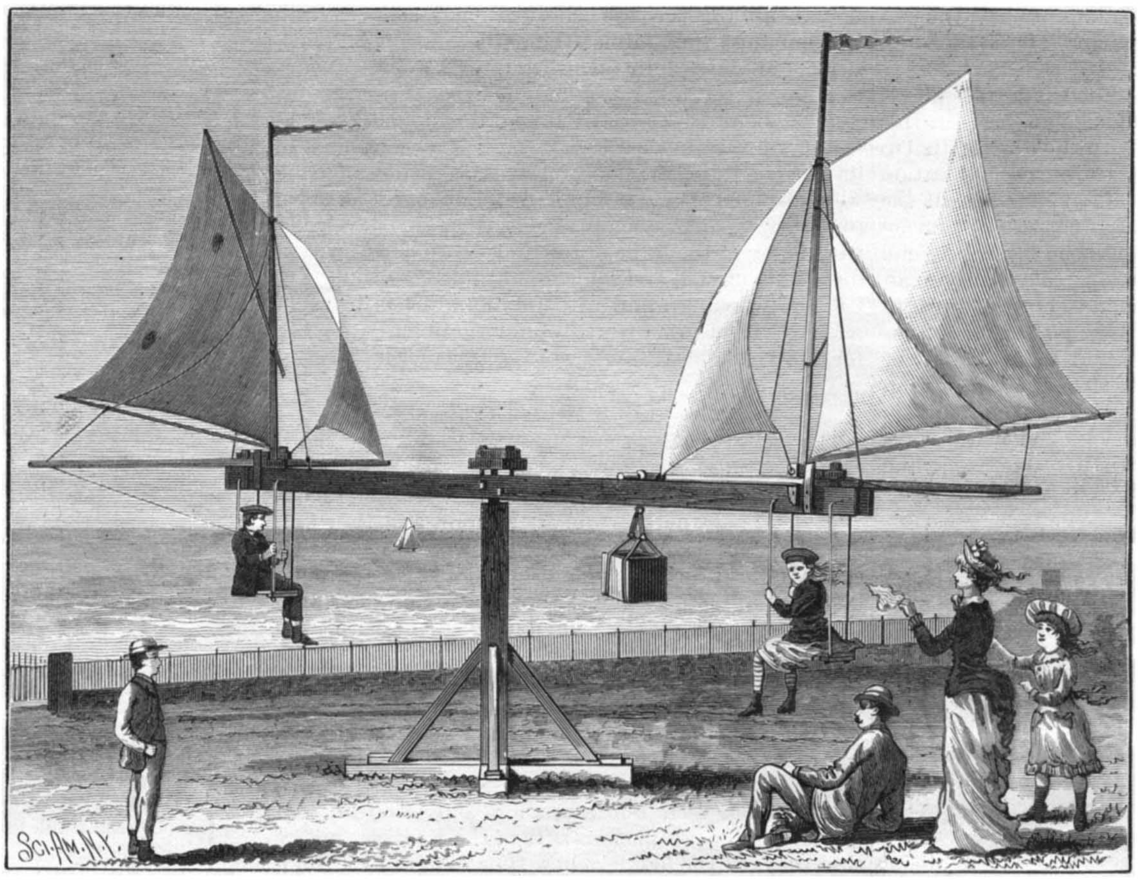
H. M. S. BENBOW.

The Benbow, built at the Thames Ironworks, Blackwall, and recently launched, is a ship to which special interest naturally attaches at the present time, because she is perhaps the most remarkable vessel of the new citadel type representing the ships termed the Admiral class, being all named after celebrated admirals—that is, the Howe, the Anson, the Collingwood, the Camperdown, the Rodney, and the Benbow. The Benbow differs from the others in carrying in each of her barbette towers one 110 ton breech loading gun instead of two smaller pieces. It is this fact that constitutes her most notable feature. The 110 ton breech loading gun ordered from Elswick is 43 ft. 6 in. long; its caliber is 16·75 in. It fires a charge of 900 lb. and a projectile weighing 1,800 lb., with a muzzle velocity of 2,020 ft. per second, giving a muzzle energy of 61,200 foot tons, with a calculated perforation of 30·5 in. of wrought iron, and an energy per ton of gun of 513 tons. These figures will be found to imply that it will be the most powerful gun in the world at present, Krupp's 119 ton gun having only 46,061 foot tons calculated muzzle energy. The Benbow is also interesting as being built by contract, for at the present moment it is very important to learn the relative advantages and disadvantages of building by contract and in the royal shipyards. The Benbow is of the mastless type, having only a pole with a top for two machine guns. She has compound armor in a belt about 8 ft. wide and 18 in. maximum thickness along her water line amidships, with a 3 in. steel deck at the top of the armor, and a horizontal armored deck fore and aft of her citadel. She is 330 ft. long and 68·5 ft. wide. Her displacement will be over 10,000 tons, perhaps running up to 10,500 tons. She has 9,000 horse power, and her speed is hoped to be 16 knots. Her barbettes are protected by 14 in. of compound or steel faced armor built at an angle, as shown. Her armament is as follows:

On her hurricane deck she carries eight quick-firing Hotchkiss 6 pounder guns and four Nordenfelt machine guns, probably four barreled 1 in. Nordenfelts in small projecting towers. On her battery deck are ten broadside 6 in. new type guns, those at the fore and aft ends of the battery training round so as to fire if need be through ports made for firing directly fore or aft. There are also on this deck four quick-firing guns and six machine guns, four in towers and two carrying shields on their carriages. In her barbette towers are the two 110 ton guns. There are also four smaller five barreled Nordenfelt machine guns, 4·5 in bore. Her top is designed to carry two machine guns. Torpedoes can be discharged ahead, astern, and abeam.

The guns on the barbette towers are of course much exposed, but the gun detachment is down below a steel circular 3 in. revolving deck. The gun is loaded by running back and lowering the breech. The type to which this vessel belongs is one which we need hardly say has been the subject of long and bitter attack by Sir Edward Reed. At present this line of criticism meets with approval from some of the best known naval officers. On the other hand, others think it has been pushed to unreasonable lengths. Citadel ships leave their ends exposed at the water line. The French barbette class, represented by the Admiral Duperre, have armor along their water line from end to end at the expense of exposing the ship in other places.

At Alexandria no shell that passed into the unarmored part of any of our vessels did serious damage, and until the introduction of quick-firing guns, few officers would, we think, believe that ships could be destroyed by such fire. It is now urged that quick fire may very quickly riddle a vessel along her water line, and so cripple her that she may be rammed. Both classes of vessels may be capsized by destruction of unarmored parts, as has been shown at the Admiralty by model experiments. But the adversaries of the citadel type urge that water is liable to enter and interfere with speed. On the other hand, such a vessel as the Admiral Duperre has her men so entirely exposed that it may be questioned if she could keep a man at any of her guns under the fire of quick guns and machine guns Some officers believe that the effect of quick fire is at present overrated. It appears probable that the construction of our ships may be so far affected by quick fire as to cause a thin belt of armor to be extended at the waterline to turn off the great mass of quick fire which may be assumed to fall on it more or less obliquely. As to ramming powers, the Benbow has a spur strengthened with a horizontal flange, and her bows are stiffened with her horizontal armor deck. With her twin screws she ought to be fairly handy.
—*The Engineer.*



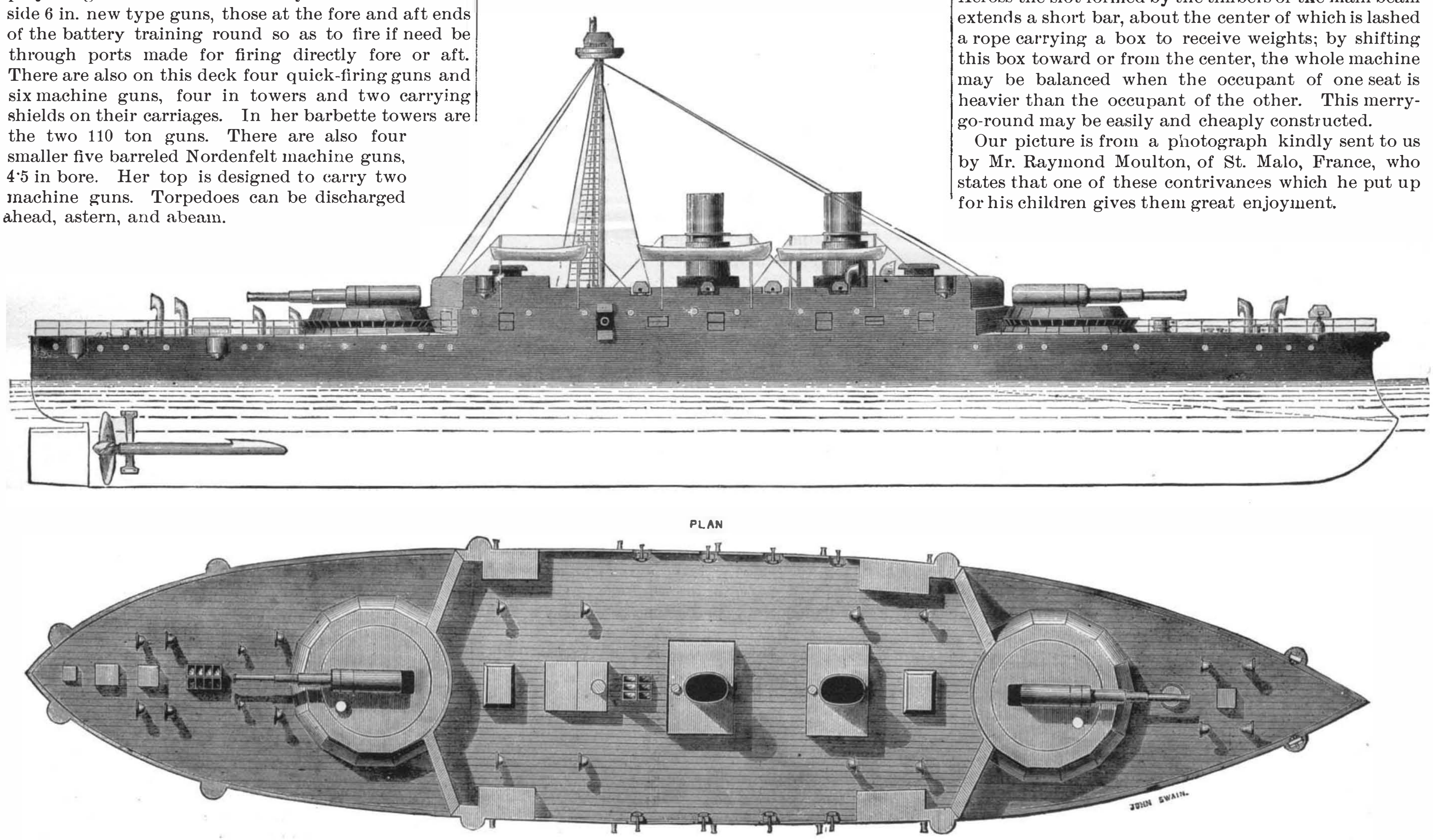
SAIL RIGGED MERRY-GO-ROUND.

SAIL RIGGED MERRY-GO-ROUND.

Our engraving shows a merry-go-round consisting of a braced standard upon the top of which is centrally pivoted a beam provided at either end with a mast and sails, and with a seat suspended by four ropes. The standard is a post six or eight inches square, and of the desired height, resting upon crossed timbers, the ends of which may be pegged to the ground or which may be made of a length sufficient to prevent tipping over; four braces support the standard. The main beam is composed of two timbers about eight inches wide and one and a half or two inches thick and of any desired length—twenty or twenty-five feet would answer admirably.

These two pieces are separated by blocks at the ends and center and bolted together, so as to form a square box without top or bottom. Upon the upper side of the center of the beam are two blocks of wood held by two bolts; the under block carries a socket which rests upon the end of a long pivot bar projecting from the top of the standard; of course this bar is long enough to permit the beam to swing clear of the standard. Across the slot formed by the timbers of the main beam extends a short bar, about the center of which is lashed a rope carrying a box to receive weights; by shifting this box toward or from the center, the whole machine may be balanced when the occupant of one seat is heavier than the occupant of the other. This merry-go-round may be easily and cheaply constructed.

Our picture is from a photograph kindly sent to us by Mr. Raymond Moulton, of St. Malo, France, who states that one of these contrivances which he put up for his children gives them great enjoyment.



THE NEW BRITISH WAR STEAMER BENBOW.

THE PARADISE FISH AND ITS NEST.

BY C. F. HOLDER.

Those who are familiar with the difficulties that attend the transportation of foreign and tropical fish to this latitude will appreciate the fact that two paradise fishes (*Macropodus viridi-auratus*) have been safely brought from India, and are flourishing in an aquarium in the museum room at Fulton Market. They seem perfectly acclimated, and it is hoped that they may be introduced into American waters in the latitude from which they were taken. That they would prove an acquisition, no one could doubt after a contemplation of their movements, and I am indebted to Prof. H. J. Rice for opportunities for examining them.

In its native country the paradise fish has a somewhat unenviable reputation, being pugnacious in the extreme; so much so, indeed, that it is used by the Siamese very much as the Malays use the game cock.

The native name of the fish is plakat, and in every town they can be found kept in glass jars and domesticated to a remarkable degree, the possibilities of which are well shown in the actions of the Fulton Market specimens. The Siamese use the fish principally in fighting, the method being to place them in glass vessels near each other, when they soon become enraged. When fully aroused they are placed together, and the result is attended with all the excitement of the prize ring, the natives betting large sums on the contest.

The following account of the appearance when excited of a variety of this fish reared for fighting purposes, is given by Dr. Cantor:

"When the fish is in a state of quiet, with the fins at rest, the dull colors present nothing remarkable. But if two are brought within sight of each other, or if one sees its own image in a looking-glass, the little creature becomes suddenly excited, the raised fins and the whole body shine with metallic colors of dazzling beauty, while the projected gill membrane, waving like a black frill round the throat, adds something grotesque to the general appearance. In this state of irritation it makes repeated darts at its real or reflected antagonist. But the fish, when out of each other's sight, instantly become quiet. This description of their actions was drawn up in 1840, at Singapore, by a gentleman who had received a present of several from the King of Siam. They were kept singly in glasses of water, fed with the larvæ of mosquitoes, and had thus lived many months. The Siamese are infatuated with combats of these fishes, and sometimes their liberty, and that of their families, is staked on the issue. The license to exhibit fish fights is farmed, and yields a considerable revenue to the crown."

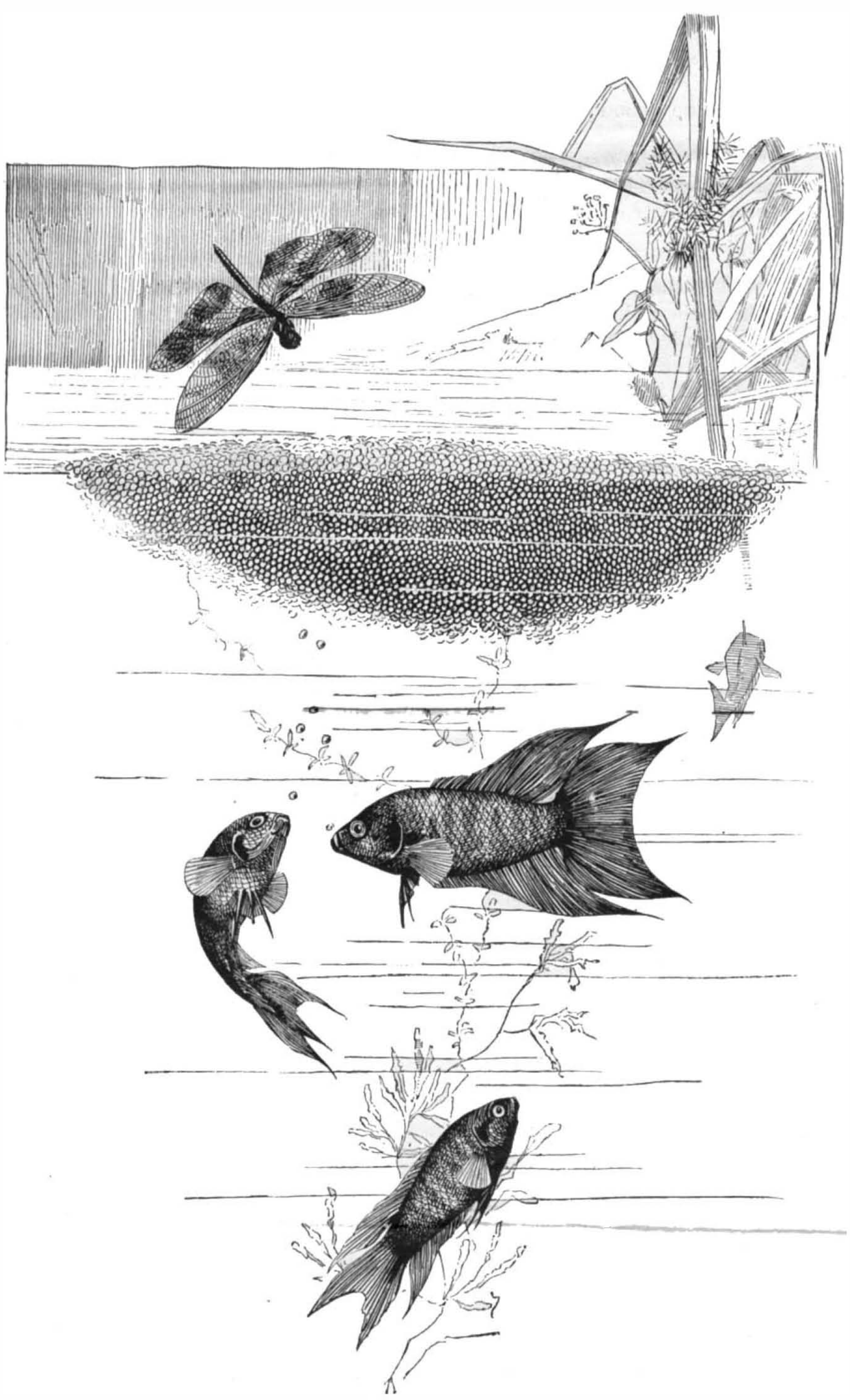
After such a description one would naturally expect to see a fish of a somewhat ferocious aspect, but, on the contrary, the Fulton Market specimens seem to be thoroughly domesticated, and on the best terms of good fellowship. This is probably owing to the fact that the pair are male and female.

They are somber little creatures, calling to mind our pomotis in general shape, though in an instant they seem to transform themselves into an entirely different creature, a paradise fish in the true sense of the word. They are about 3 to 3½ inches in length, of a sober greenish-brown hue, with darker and small spots. When moving along quietly, they look very much like some of the peculiar forms of gold fishes with trilobed tails, and would, perhaps, attract but little attention. If anything occurs to excite them, the change is instantaneous; the dorsal and caudal fins develop into enormous fans, and appear to vibrate with excitement. Each ray springs into an erect position, booming out the living sail, as it were, so that the fish appears to have almost doubled its size.

The secret of this transformation is seen by an examination of the fins. The dorsal and anal fins are alike, and commence in the same relative position, as shown in the accompanying illustration. They extend back for half an inch, retaining the same height, then suddenly enlarge, the rays reaching gracefully away, like plumes, so that they extend beyond the end of the vertebral column an inch or more. Here they seem to join the tail, which is almost twice the width of the fish, also ending in points.

With such an array, the movements of the fish could not be other than graceful. The waving plume-like appendages were constantly in motion, forming graceful curves as the fish darted about, expanding when they remained stationary, and closing when swimming, affording a continual change of picturesque attitudes to the observers. Every motion of my hand or finger against the glass was quickly noticed, and they would instantly arise to the surface. Professor Rice informed me that they readily fed from his hand, a common trick of the common sunfish. I recently possessed one of the latter that not only took flies from my hand, but would thrust its head out of water as far as the pectoral fins to take them.

So active are the paradise fishes, alive to every movement, that they present a strange contrast to the clumsy golden carp in the same tank. All the fins become erect in a manner that reminds one of the sudden spreading of the peacock's tail. There was also another curious movement that seemed to quite change the expression of the fish. As soon as they met they remained stationary, face to face, for a moment, each expanding or opening the gill covers, so that they appeared puffed out at quite an angle, exposing the red gills quite plainly from behind. This salute, or whatever it was, was performed four or five times in as many minutes; in fact, every time they met in their movements up and down the tank. At times they would face each other, and, while retaining the same relative position, move round and round each other, their plume-like fins waving behind and presenting an attractive appearance.



NEST OF THE PARADISE FISH.

The nest building, which Professor Rice has been fortunate in observing, is carried on, as is the rule with other nest building fishes, entirely by the male. Approaching the surface of the water, he sucks in a mouthful of air with a clicking sound, and descends six or eight inches below, then facing the surface he releases the air in small mucus covered bubbles, that rise to the surface, joining together, adhering, however, very lightly at first. Another mouthful of air is taken and other bubbles added, until finally a platform of these floats rests upon the water, forming a raft, perhaps four or five inches in diameter. Others are then added that tend to lift the upper layer, so that it has a convex surface, or resembles a watch crystal. Bubbles are added until the nest is three or four inches deep, according to circumstances, and undoubtedly it is often larger. In Professor Rice's aquarium the nests were, perhaps, not as complete as they would have been in open water, and the mass of bubbles was comparatively small and easily blown apart by the breath. Age would, however, soon render the nest more compact; fungoid growths would seal the bubbles together, and in a short time the nest would be of a consistence to resist the strongest breeze. When the fish had completed his labors, he began to chase the female about, endeavoring to drive her in the direction of the nest, but in this he failed, she probably not being ready for the maternal duties.

In their native streams the female deposits her eggs under or in the mass of bubbles; there they are held until hatched, the young at first feeding from the mucous spittle, if so it may be termed, of which the nest is made. Professor Rice suggested to me that it was possible that there was more architectural ability shown in the structure of the nest than would appear from a casual glance, and that the eggs were not deposited at random in the mass, but found their way into the upper portion, that he thought might be a pseudo air chamber formed by the extreme upper layer of bubbles and the layer resting upon the water. Whether this is the case will be determined when the eggs are deposited. It would appear more likely that they are deposited at random, and cling wherever they are caught by the bubbles.

A large number of marine fishes deposit their eggs either upon the surface or in position where they ultimately rise, and those of the angler are inclosed in a long gelatinous ribbon; but in the paradise fish we find a decided improvement, as if the fish had learned by experience that if its eggs became separated they would fare badly; hence the bubble nest was extemporized to keep them together at the surface, where, perhaps, in the disguise of a mass of froth, they float about, safe from all predatory enemies.

The Nature and Treatment of Different Woods.

From a paper read before the Chemists' Assistants' Association, London, by John Woodland, F.L.S., the following interesting and useful facts are gathered. Wood, commences the lecturer, is a hard, permanent, cellular, and vascular structure, formed by plants. The following woods are used when elasticity is required: ash, hazel, hickory, lancewood, and yew. The following are in use when toughness is required, combined with elasticity: beech, elm, hornbeam, oak, and walnut. For durability in dry situations, cedar, chestnut, oak, poplar, and yellow pine are chosen. For coloring purposes, Brazil wood, camwood, logwood, and Nicaragua wood are used to furnish a red, green ebony a green, and fustic a yellow color. For ship building, elm, fir, larch, pine, and teak are used. For piles, as supports for piers or landing stages, etc., alder, beech, elm, oak, and plane are in common use. For house building purposes, the ash, chestnut, fir, oak, pine, and sycamore are much used. When hard woods are required, box, lignum vitæ, and mahogany are serviceable.

Timber is wood which has been prepared from trees or shrubs, so as to be fit and durable for the purpose for which it is selected. When soft or moderately soft wooded trees are to be felled, mid-winter is the best period of the year, on account of their containing the least amount of sap at that time; the next best period being the middle of summer, as, although at this latter period there is a large quantity of fluid in the stem, still there is not the same amount of nitrogenous fermentable principles as are found in spring and autumn.

If the tree be a hard wooded one, the period of the year at which it is felled does not matter to any great extent. In order to render the wood fit for timber, it must be thoroughly seasoned by slow drying. If the wood is to be used in an exposed position, the moisture with which it naturally comes into contact would be liable with the constituents of the sap to cause decomposition, hence water seasoning is frequently resorted to. A running stream being chosen, the logs of wood are sunk in it for about two or three weeks, after which they are taken out and seasoned by slow drying; in this process all the constituents of the sap are washed away, and fermentation or decomposition is thus prevented. Other means employed to preserve wood which is exposed to moisture from the soil, such as gate posts, telegraph poles, hop poles, and railway sleepers, are: (1) charring the outer surface; (2) painting, using with the paint fine sand, pumice, or finely powdered glass, which has been previously incorporated; (3) immersing and standing in bitumen, tar, or creosote; in either of which cases the wood is penetrated to the center by the preservative material; (4) the process termed "kyanizing," which is now obsolete, and consisted of impregnating the wood with perchloride of mercury by means of a solution of the salt; (5) a process called "Burnettizing," which has proved so successful at Woolwich, and consists of soaking wood in a solution of zinc chloride made in the proportions of one pound of the chloride to five gallons of water.

A splendid example of the preservative action of salt on wood is seen in the salt mines of Poland and Hungary, the wooden supports in which have existed for ages.

Wood, when exposed to a damp surface and not well ventilated, is often attacked by fungi, commonly called dry rot, the mycelia of which rapidly spread, till in time the hard wood is replaced by a small, powdery looking substance. As this fungus only attacks wood when it is moist, the term "damp rot" is obviously more correct.

Mr. Woodland then enumerated some ordinary woods, together with their sources and what peculiarities they may furnish.

Alder, obtained from *Alnus glutinosa*, Betulaceæ.—Especially adapted for withstanding the action of water, hence is used in connection with cog wheels of mill stones, pumps, drains, piles in water or mud, heels of wooden boots, etc. The best gunpowder is also made from the charcoal furnished by the alder.

Ash, obtained from *Fraxinus excelsior*, Oleaceæ.—This wood is lighter in weight and more elastic than that of the oak, and is less liable to be broken by a cross strain, hence its use for billiard cues, poles, ladders, etc., but being fibrous it is more easily split than the oak. The yule logs of Christmas celebration were formerly furnished by this tree.

Aspen, from *Populus tremula*, Salicaceæ.—The wood is not so good as that furnished by the white poplar, being porous, soft, and white; it is chiefly used for field gates, milk pails, packing cases, etc.

Beech, from *Fagus sylvatica*, Cupuliferæ.—The wood is brittle and hard, but is apt to decay soon; carpenters' plane frames and other tool handles are made with it, and cabinet makers use it for shelves, etc. Next to the oak this is the largest tree growing in England. Of this wood the Greek ship Argo was built, and in ancient times the wine bowls were made of it.

Birch, from *Betula alba*, Betulaceæ.—This is one of the aboriginal trees of our island, as shown by the presence of twigs still retaining their silvery bark which are found in the lower strata of the peat bogs existing in the North of England and around Manchester. The wood known as Norway birch is much used in the Highlands and further south for making wicker hurdles, tying fagots of wood, and thatching straw roofs. It is from the bark of this tree that an oil is yielded from which the peculiar odor of Russia leather is derived.

Brazil wood, obtained from *Cæsalpinia crista*, Leguminosæ.—This wood is used for dyeing purposes, the colors obtained being red, rose color, and yellow. *Braziletto wood* is furnished by *Cæsalpinia brasiliensis*, and produces red and orange colors.

Box, from *Buxus sempervirens*, Euphorbiaceæ.—The boxwood of commerce comes from Turkey, Asia Minor, Circassia, Spain, and Portugal. This wood, being very close grained and heavy, is largely used by turners, engravers, and carvers, also for the manufacture of mathematical instruments and articles that will take a high polish; the pure bitter it contains preserves it from the attacks of insects.

Cherry, *Prunus cerasus*, Rosaceæ.—This wood is hard and tough, also light and porous; it is used by turners and engravers, and for constructing pipes.

Chestnut, from *Castanea vesca*, Cupuliferæ.—The timber is chiefly used for beams and rafters of houses, heads and staves of casks, and as protecting gutters for gas pipes, etc., underground. There is one plant growing at Tortworth in Gloucestershire more than 1,100 years old. The diameter at base is 15 feet.

Dogwood, *Cornus sanguinea*, Cornaceæ.—The wood is used for preparing gunpowder charcoal, and, on account of its hardness, for skewers, cogs for wheels, etc.

Ebony, from *Diospyrus ebenus* or *Diospyrus ebenaster*, Ebenaceæ.—The heartwood only of this tree is black, and being very hard, durable, and wear-resisting, its uses are many and various; besides this wood, which is known as "Bastard Ceylon Ebony," we have a black ebony yielded by *Diospyrus melanoxylon*, also a fine variegated wood yielded by another species, namely, *Diospyrus quasita*, which makes handsome furniture. There are also red and green ebony woods.

Elder, from *Sambucus nigra*, Caprifoliaceæ.—This plant while young grows with great rapidity, but when it attains the height of from 20 to 30 feet, its growth is arrested. When young the wood is soft, but when old it becomes almost as hard as boxwood, and in a variety of cases can be substituted for it; butchers' skewers and tops of fishing rods are commonly made of this wood.

Elm, from *Ulmus campestris*, Ulmaceæ.—The wood is hard, finely grained, and hence not apt to crack. It is used for the keels of vessels and wooden fittings of ships, also for cart wheels and coffins; it attains its maturity at an age varying been seventy and eighty years.

The *Whych Elm*, from *Ulmus montana*, Ulmaceæ, furnishes a wood that is both strong and elastic, hence it is used for spade handles, garden forks, and rake handles. The gnarled wood is largely used by cabinet makers for veneering. Both this and the preceding elms furnish woods which are tough and not readily acted upon by water.

Fir trees belong to the genus *Abies* of the natural order Coniferæ; they were formerly called "fire trees" on account of the inflammability of their wood, due to the oleoresin it contains. These trees having a conical shape can thus be told from what are termed "pine trees;" one fir tree (*Abies excelsa*) is the tallest in Europe, its average height being 150 feet. Cf. *Pine.*

Abies excelsa is the Norway spruce, and furnishes the white deal used so much for building purposes. *Abies pina* is the silver fir. The stems of each of these fir trees are largely used for making masts, telegraph poles, signal poles, and building planks, and also for splitting up into matches.

Fustic, obtained from *Morus tinctoria*, Moraceæ.—The wood in chips is largely used as a dyeing agent.

Guaiacum, from *Guaiacum officinale*, Zygophyllaceæ.—This wood (the heartwood of the plant) is commonly called "lignum vitæ" on account of its durability and hardness; it is peculiar, in that the fibers composing it cross each other diagonally, so that cleavage of the wood is difficult. It is much used for making rulers, skittle balls, wheels, and cogs for sugar mills, pulleys, etc.; in parquet flooring, by heating the flat pieces of lignum vitæ, the natural resin exudes and aids in agglutinating it to its neighboring pieces.

Hazel, from *Coryllus avellana*, Cupuliferæ.—The wood is very tough and flexible, and is used in making hurdles, crates, fishing rods, hoops for casks, etc. A forked twig of hazel was reputed to have the power, when held in the hand of a suitable person and pointing to the ground, of a divining rod, by directing the holder to a place underneath which water exists.

Hickory, from *Carya alba*, Juglandaceæ.—The wood is tough and elastic, and will stand prolonged strains; it is used for fishing rods, walking sticks, Canadian paddles, etc.

Hornbeam, from *Carpinus betulus*, Cupuliferæ.—The wood is hard, tough, and white; it will burn like a candle, so with frayed ends will act as a temporary torch. It is chiefly used for the manufacture of agricultural implements and the cogs of mill wheels.

Lancewood, obtained from *Duguetia quitarensis*, Anonaceæ, or according to another authority, *Guatteria virgata*.—This wood is tough and elastic to a very high degree, and being at the same time of light weight it is admirably adapted for making shafts of carriages, bows and arrows, fishing rods, and lances.

Larch, obtained from *Larix Europæa*, Coniferæ.—The wood is fit to use for timber when the tree is forty years old; there is a great objection to its use on account of its warping, even after having been seasoned. It was formerly and superstitiously believed that the wood was impenetrable by fire. The American larch, called "hackmatack," is a heavy and cross grained wood.

Lime, obtained from *Tilia Europæa*, Tillaceæ.—This wood, called commonly "linden wood," is used by carvers and turners, owing to its being close grained and smooth.

Mahogany, from *Swietenia mahogoni*, Cedreliaceæ.—This well known wood is sent from Central America and the West Indies. Some trees have been known to produce as much as £1,000 each.

Maple (*red*), from *Acer rubrum*, Aceraceæ.—A variety of this produces curled maple, so called from the accidental undulation of the fibers; it one of the most ornamental woods known. It is used for furniture making and also for making stocks of rifles and fowling pieces.

Maple (*sugar*), *Acer saccharinum*, Aceraceæ.—This furnishes the so-called "bird's eye maple," and is highly prized for furniture making.

Mountain Ash, or *Rowan tree*, from *Pyrus aucuparia*, Rosaceæ.—The timber is much used for carriage and cart wheels.

Oak, from *Quercus robur*, Cupuliferæ.—This tree in temperate climates is the largest in size, the longest lived, the hardest and most durable as regards its timber, and most common of trees. The oak which has stalked acorns furnishes the best timber, which possesses great strength, tenacity, and durability. The white American oak, *Quercus alba*, has a reddish timber, which, though more elastic than the English kind, is not so durable. Red oak, *Quercus rubra*, furnishes a deep colored timber, which, being coarser in texture, is not so useful. Oak bark is used for tanning.

Pear, from *Pyrus communis*, Rosaceæ.—The variety furnishing the hard or baking pears has a very hard wood, which is used chiefly for musical instruments, tool handles, etc.

Pine trees belong to a genus called *Pinus*, Coniferæ.—The trees can be told from fir trees by being more or less flat at the top, where nearly all the branches congregate. *Scotch Fir, Pinus sylvestris*, yields the timber known as Dantzic or Riga fir, and Russian deal. It grows from 60 to 100 feet high, and is fit for timber at the age of 50 or 60 years. The best quality timber is from trees that have grown in cold situations, such timber equaling the oak in duration. *Pinus strobus* furnishes the white pine or deal of the United States; it is called the "Weymouth pine." The wood is used for bowsprits and yards of men of war. *Pinus mitis* and *Pinus palustris* furnish yellow pine or deal. The latter pine will grow in very sterile soils, yet yields a wood which is more compact, stronger, and durable than that obtained from the other species. The least valuable of the pines is the *Pinus tæda*, or "loblolly pine," the timber of which decays on exposure to air. The uses of pine trees are similar to those of fir trees.

Plane, from *Platanus occidentalis*, Platanaceæ.—The wood is a fine grained one, and becomes of a dull red color in the seasoning; it is occasionally used by cabinetmakers, but quickly decays if exposed to the weather.

Poplar, from *Populus alba*, Salicaceæ.—Wood is white, light in weight, and soft; it is not used for any purpose in particular, though that of the Canadian poplar, *Populus monilifera*, is largely used for flooring. One poplar, namely, the balsam poplar, *Populus balsamifera*, in the form of timber, is quickly rotted by water, like the wood of the horse chestnut, hence, to protect the young beds of these trees from moisture, as rain, etc., we find a thick covering of resin present during winter and spring.

Sandalwood, from *Santalum album*, Santalaceæ.—This wood is sent from Malabar and the East Indian Islands. It is used for making small articles of cabinet furniture, and its odor prevents insects or worms attacking it.

Spindle tree, from *Euonymus Europæus*, Celastraceæ.—This wood is hard, white, and finely grained; it is used for musical instruments, netting needles, spindles (hence the name of the tree), and skewers. In France gunpowder charcoal is obtained from it, and the young shoots when charred form a rough drawing pencil.

Teak, or Indian oak, from *Tectona grandis*, Verbenaceæ.—This wood is very strong and durable. It is largely used in ship building.

Tortoise wood, so called from the resemblance of the wood to tortoise shell, is obtained from *Guettarda speciosa*, Rubiaceæ, and the same plant is by some authorities said to yield the striped or zebra wood used by cabinet makers.

Walnut, from *Juglans regia*, Juglandaceæ.—This is now largely in use for furniture. Before the introduction of mahogany this was almost exclusively used for furniture making. It is also used for gun stocks, as it is lighter in proportion to its strength and elasticity than any other wood. Black walnut, from *Juglans nigra*, furnishes a strong and tenacious wood, and when well seasoned is not liable to warp or split; it is also secure from the attacks of insects.

Willows.—The Goat Willow, or Sallow, *Salix caprœa*, furnishes the best willow timber; when growing as a coppice plant, it furnishes hoops, poles, and rods for crates. The timber of the willow is white, soft, and light, the best seasoned kinds being very durable. The dwarf willows, *Salix viminalis* and *Salix rubra*, are propagated by cuttings for furnishing osiers or willow shoots, from which hampers, baskets, etc., are made.

Yew, from *Taxus baccata*, Taxaceæ.—The wood is peculiarly hard, smooth, and tough, and was formerly used for making bows; it is beautifully veined and will take a high polish, hence is used by cabinetmakers for veneering purposes; being very hard and durable, it is used for cogs for mill wheels, axles, and also floodgates of rivers, which scarcely ever decay.

Zebra wood. See Tortoise wood.

To Restore Color.

It is customary to use ammonia for the purpose of neutralizing acids that have accidentally or otherwise destroyed the color of fabrics. This must be applied immediately, or the color is usually imperfectly restored. After careful use, an application of chloroform will bring out the colors as bright as ever. Plush goods and all articles dyed with aniline colors, faded from exposure to light, will look as bright as ever after sponging with chloroform. The commercial chloroform will answer the purpose very well, and is less expensive than the purified.

A Good Idea.

Some one in the London *Field* suggests that "if a man wants a carriage or implement photographed so as to make a working copy to scale, all that is necessary is, when the photo is being taken, that a clear and distinct 3 foot rule be placed on the carriage; this is photographed along with the carriage, and no matter what the size of the print or negative, will always be a true scale. It enlarges and diminishes in exactly the same proportion as the carriage.

ENGINEERING INVENTIONS.

A valve gear for direct acting steam pumps has been patented by Mr. John C. Dean, of Indianapolis, Ind. This invention consists of an auxiliary piston which carries the main valve of auxiliary valve and ports, and connections for imparting a long and adjustable stroke to the auxiliary valve.

A automatic waste valve for engine cylinders has been patented by Mr. Warren R. Townsend, of Grand Rapids, Mich. It is made to be closed by the steam pressure and to open by a spring when the boiler pressure is cut off from the cylinder, the valve remaining wide open when the engine is at rest, thereby allowing free escape of water.

A railway switch has been patented by Mr. David H. Valentine, of Brooklyn, N. Y. This invention consists of a triangular switch beam having independent sides for a portion of its length and provided with a block secured between its sides at the larger end, the object being to provide a practical railway switch without a frog.

A locomotive pilot has been patented by Mr. Frank B. Hoesl, of Buffalo, N. Y. The frame is heavier and larger than usual, and there is an elastic covering supported over it, consisting of coiled springs arranged to receive any shock of collision lengthwise, so the springs will cushion the blow, and obstacles will be easily lifted and thrown aside from the track.

The fastening of fish plates of railway rail joints forms the subject of four different patents issued to Mr. Thomas A. Davies, of New York city. This invention is to make a tight bearing joint that will give and take and hold the fish plates with a uniform bearing against the rails, and the invention in part consists in the use of a spring metallic washer with a bolt hole in its center, curved in the form of a section of hollow cylinder, and with the greatest thickness of metal opposite the bolt hole in the line of the length of the cylinder, whereby a uniform elasticity will be given to all parts of the washer. Two of the patents are for combination of parts and the use of angular springs, in connection with the rivets or bolts of the joint, whereby the wear will be constantly taken up, and the joint held firm. while another patent covers fish plates with a flange on their inner sides near their upper edges, combined with the rails, spring washers, etc., whereby the joints will be held rigidly in line both laterally and horizontally.

AGRICULTURAL INVENTIONS.

A plow has been patented by Mr. William H. Hodgson, of Winona, Minn. There is an extension of the short bar back of the joint where the landside plate joins the share, in a recess in the landside, the bar being securely held by the bolts that hold the landside plate, thereby keeping the point of the share in place and serving to make a very strong short bar plow.

MISCELLANEOUS INVENTIONS.

A spring bed bottom has been patented by Mr. John R. Deihm, of Pottsville, Pa. It is composed of slotted plates, coiled and straight wires, and connecting links, in combination with rollers for tightening up the bottom, avoiding the use of a separate form for holding the bed bottom.

A hoop or band for barrels and other like receptacles has been patented by Mr. James W. Weston, of New York city. It consists of a looped hooping or banding wire, made of a single strand, the loops being of sufficient size to receive the shanks of nails, but not to allow the heads to pass through.

A stalk cutter has been patented by Mr. James K. Patterson, of Crete, Neb. It cuts with a reciprocating action, thus preventing clogging, and the knife is so arranged that in case of its striking a stone or other solid object it would yield thereto, while the machine is strong, cheap to build, and easy to handle.

A base for cheese covers has been patented by Mr. John E. Keck, of New York city. It has an annular groove with lining, in which water can be kept for the flange of the cover to rest in, thus providing a water seal, to prevent the cheese inclosed from becoming dry.

A fire kindler has been patented by Mr. John Meil, of Baltimore, Md. It is formed solely of fire clay, so burned during a period of six or seven days as to be sufficiently porous to carry enough oil to accomplish the purpose, but sufficiently strong to withstand intense heat, which allows of its being left in the fire, but does not impair it adaptability for future use.

A spring take up for wax thread sewing machines has been patented by Messrs. Cornelius Drumm and William Wyker, of Jefferson City, Mo. The device is made in the form of an attachment to be applied to the head of the machine, and is adjustable to suit the size of thread used and the length of stitch to be made.

A saw set has been patented by Mr. John A. Borthwick, of Atlantic City, N. J. It is to be operated in the manner of a pair of nippers by means of pivoted handles, one handle having a clamp for holding the saw and the other handle operating an adjustable rotary disk by which the tooth is bent down upon an anvil.

A boneblack drier has been patented by Mr. Edward P. Eastwick, of New York city. By this invention steam is used instead of a current of air, the steam being superheated by waste gases from the kiln; the vapors emitted from the drier are likewise conducted into a condenser, where the latent heat may be utilized, and thus promote economy in the operation.

A breastpin watch has been patented by Mr. Daniel Goldsmith, of New York city. The watch is held on a breastpin in such a manner that it can be connected with the pin by means of a flexible or folding device adapted to be contained within or behind the pin, and when the watch is withdrawn the device is extended or lengthened.

A pantaloon protector has been patented by Mr. Franklin R. Hogeboom, of Brooklyn, N. Y. It is a flat plate or strip, with attached hooks, adapted to lie under cover of the rear portion of the bottom hem of the pantaloon leg, the hooks projecting above the hem to engage with an upper portion of the cloth, to prevent such part from trailing in the mud.

A swimming shoe has been patented by Mr. John A. Couper, of Marietta, Ga. Combined with a foot plate are apertured lugs projecting from the bottom, a rod held on the lugs, with wings on the rod, so that when the swimmer strikes out the wings swing open and offer much resistance to the water, but when the foot is drawn forward the wings swing together.

A folding ladder has been patented by Mr. John Ready, of Littleton, N. H. Combined with hinged ladder sections are spring catches and notched blocks for holding the sections in line, making a ladder which can be folded compactly, erected and adjusted for use easily and rapidly, and will be stiff and rigid.

A grip for ice shavers has been patented by Mr. Harry G. Carnell, of Dayton, O. It is formed of a metal plate secured on a block and having two downwardly curved jaws which have teeth on their ends for gripping a block of ice, making a holder to retain a piece of ice while sliding it over a planer to shave the ice into small chips.

An improved style of roofing has been patented by Mr. Charles H. Starr, of Logansport, Ind. It is more especially designed for railway cars, etc., and to allow of free expansion and contraction, there being gutters in spaces between the roof boards, spanned by roofing plates with downturned flanges, cap plates spanning the gutters and overlapping the roofing plates.

A cistern and tank cleaner has been patented by Mr. Raymond B. Scudder, of New Orleans, La. The pressure of the water or liquid in the cistern or tank is used for driving out the sediment through the cleaner, the latter having a fixed position of rotation for a scraper, so as to clean out the undesirable collection on the bottom of the receptacle.

A pocket has been patented by Lily F. Roberts, of Kentucky Town, Texas. It is a watch pocket for the use of ladies and others, of sheet metal, lined with soft material, and provided with a pin by which it may be attached to a garment, the pocket being neat and durable, and such as can be engraved or enameled or otherwise ornamented.

A window bead fastener has been patented by Mr. Charles R. Nelson, of New York city. A specially devised slotted box or thimble is used in connection either with a flat or round headed screw, with sometimes a roughened washer to prevent slip after adjustment, to maintain the requisite fit or tightness of the sash.

A window sash has been patented by Mr. Henry Valk, of Chicago, Ill. This invention covers a device for pivoting sash and connecting them to sliding side rails, consisting of a plate with screw holes and a headed pin formed solid therewith, so the sash may be swung vertically and at a greater or less angle to the side rails.

A steam radiator has been patented by Messrs. Juan B. Avci and John Chapman, of Brooklyn, N. Y. This invention consists principally in the employment of independent tubes for coupling the steam pipes to the steam chambers, whereby any of the pipes may be removed from the radiator without disturbing the other pipes.

A rotary blower has been patented by Mr. Isaac D. Weaver, of Lebanon, Pa. By this invention it is sought to avoid the loss due to the rise and fall of the valves, and the waste in the clearance spaces in the cylinder and passages, in order to obtain compression to better advantage than can be effected with the common reciprocating compressors.

A stirrup has been patented by Mr. Ephraim M. Turner, of Fort Worth, Texas. The frame of the stirrup has an upper tubular cross tie in open communication through the sides, and serving for attachment of the stirrup strap, with other special features, intended to give the rider's foot a firm hold on the stirrup in the ordinary course of riding.

A folding ladder has been patented by Messrs. August Bormann and Emil Ekhard, of Brooklyn, N. Y. It consists of pivoted side links, rungs pivoted to every second joint of the links, and blocks applied to the joints and formed with shoulders or offsets, to prevent the links from opening beyond a straight line outward.

A check rein swivel has been patented by Mr. Jacob Johnson, of Ashland, Neb. This invention relates to improved connections for driving reins, and covers a U-shaped metal piece. with the ends of its prongs united by a cross piece, on which a sleeve is mounted loosely, and around which a strap is passed connecting with the bit, with other novel details.

An animal catcher has been patented by Mr. William Ramm, of Kemma, Neb. It has a hook head fixed to a handle, a pivoted catch lever with right angular arms, and with a projection which locks into the teeth of a spring pressed pawl when the catch lever swings around to inclose an animal's leg between it and the hook head.

A guard for steamboat paddle wheels has been patented by Mr. John Murphy, of Brooklyn, N. Y. It consists of semicircular side pieces mounted loosely on the shaft at opposite sides, with wires between the pieces to form a guard or cage for receiving or protecting the lower half of the wheel, and preventing damage from ice or other floating substances.

A whip has been patented by Mr. Ephraim M. Turner, of Fort Worth, Texas. It is more particularly intended for stock farmers, the body or core consisting of cotton or other vegetable fibrous material, with wire wrapped about or incorporated therewith, combined with a vulcanized rubber covering, there being a metallic or other rigid handle.

A rein holder has been patented by Mr. Frank S. Osborn, of East Sharon, Pa. A frame is adapted to be secured to one edge of a dash board, inclined, and having jaws, a rod, and connecting jaws, with a rubber block, behind the rod within the frame, so that when herein fastened to the dashboard the reins will be securely held, but can be easily pulled in the direction from the horse.

An oil filter has been patented by Mr. Daniel S. Neiman, of Fargo, Dakota Ter. Combined with a tank having filtering material is a series of strainers placed one above another in the tank, and partitions, the strainers being slanted alternately in opposite directions, a coiled steam pipe being also used, the object being to cleanse oil which has been used for lubricating.

An extension trestle has been patented by Mr. Henry H. Childers, of Louisville, Ky. This invention provides means for supporting that portion of long timbers, planks, etc., which extend beyond the tables of saw benches, mortising machines, etc., when being worked, the trestle being readily adjustable to the height required to support the work, and easily lowered out of the way.

A photographic printing apparatus has been patented by Messrs. William Hill and Thomas R. Wilson, of Salt Lake City, Utah Ter. A multifaced cylinder or polyhedral drum is combined with a negative holder of peculiar construction, with clockwork for causing an intermittent rotation of the cylinder, to act automatically to feed the sensitive paper and remove the pictures when printed.

A lifting jack has been patented by Messrs. George S. and James M. Bowling, of Clarksville, Tenn. Its base has a notched slot with post fitted to turn and slide therein, catching the notches in the slot, with a lifting lever pivoted to the post and having a notch to engage the axle or other object to be lifted, the device being especially applicable for raising the axles of vehicles for greasing or repair.

A ventilator has been patented by Mr. Reinhold E. Henninges, of Cleveland, Ohio. Combined with a metal frame having a slot, and adapted to be set in a recess of the window sash, is a valve, pivoted at its lower edge and having an arm projecting rearwardly through the slot, with cords extending back through the recess and down the inner side of the window, for opening and closing the air valve.

A sash fastener has been patented by Mr. Reinhold E. Henninges, of Cleveland, Ohio. The box with the pinion is so arranged that it is adapted for attachment to the top rail of the lower shaft, and both sashes may be raised and lowered simultaneously, or locked in any adjustment, or one may be raised or lowered alone, with which are also improved devices for locking and releasing the pinion.

A feeding mechanism for wool carding machines has been patented by Mr. Frank G. Babcock, of Dryden, N. Y. It is intended for feeding wool to first breaker cards, and to automatically increase in distance of movement, as required, to mat the wool evenly upon the feeding web or apron, and has a special mechanism for automatically changing and regulating the feed according to the running of the work.

A cash carrier has been patented by Mr. Robert F. Gibson, of Zanesville, Ohio. This invention provides means for placing cash boxes on and removing them from the inclined tracks with facility, and so that more than one box can be passed over the tracks at or near the same time, when cash boxes are thus made to travel by gravity between the salesman and cashier.

A bed plate for paper pulp engines has been patented by Mr. Frederick S. Taylor, of Riegelsville, N. J. It is of cast metal, with a series of inclined slots forming a series of inclined bars and a series of cross bars, intended to be less expensive to manufacture than ordinary bed plates, and so that the cutting or wearing parts when worn out can be replaced at a small cost.

A thill coupling has been patented by Messrs. George H. Holzbog and Mathias J. Weicksler, of Jeffersonville, Ind. This invention consists in a coupling hook provided with a downwardly projecting lug or tongue having a notch in its end for receiving the free end of a spring held on the axle clip, the construction being such as to prevent rattling and accidental uncoupling.

A fastening device for coffins has been patented by Mr. Solomon A. Argerbright, of Decatur, Ind. The invention consists principally of a dovetailed clutch of peculiar construction adapted to be placed in a recess made in the edge of the coffin to receive the head of a screw in the lid or cover, the coffin having several such catches and the lid several screws and a spring catch.

A burglar alarm has been patented by Mr. William Goldspohn, of Lodi, Wis. It is made with a sliding block having an arm to engage with a pin upon an escapement wheel, the escapement of which carries a bell hammer, and which is driven by a spring connected with the casing, with other novel features, making a device that can be readily connected with a door knob or disconnected therefrom.

A fire escape and elevator has been patented by Mr. Charles R. S. Curtis, of Quincy, Ill. This invention provides means for stopping the carriage should the hoisting rope break, and for moving the carriage by hand power and holding it securely independently of the hoisting rope, also to prevent the fall of the carriage when operated by the hand gearing in case the operator by mistake disconnects the gearing.

A thread unwinder has been patented by Mr. Lyman R. Hopkins, of Brooklyn, N. Y. It is a simple mechanism to be placed upon a sewing machine table to hold a large stationary spool, and guide the thread in its passage from the spool to the needle bar; but is so made as to stop should the thread break, and thus prevent the thread from becoming entangled by the forward movement of the machine.

A gate has been patented by Mr. Paul T. Keegan, of Albany, Wis. This invention relates to improvements in gates supported to slide on rollers journaled on a crane hinged to the gate post and adjustable at varying heights on the crane, so the gate may be swung fully open both ways, and the crane rollers so placed that the hands will not be caught and injured by them.

A burglar alarm has been patented by Mr. Morris Pratt, of Milton Junction, Wis. Combined with a frame is a shaft and cranks, a ball on one crank, a gong on the frame, a cord on the shaft, a weight on the cord, and a sliding latch or bolt on the frame, to which a cord is fastened extending to the doors and windows, the object being to simplify the construction of mechanical burglar alarms.

An ice hook has been patented by Messrs. George W. Palmer, of New York city, and George W. Kidder, of Staatsburg, N. Y. It is made with a handle strap having a socket, lugs, and apertures, with a clamping bolt for securing a detachable prong by a wedge key, so the prongs can be readily adjusted to adapt the ice hooks to be used by tall or short men.

A magic lantern has been patented by Messrs. Henry and George Davenport, of Somerville, Pa. Combined with a box having a mirror on the inner surface of each end, and two mirrors on the inner surface of the front, there is a lens tube in the front and a picture holding slide on the back, making an improved apparatus for reflecting pictures on a screen or wall.

A case for copy books and copies has been patented by Mr. Daniel A. Radley, of Lawrenceburg, Mo. This invention is an improvement on a former patented invention of the same inventor, and furnishes a receptacle for writing materials and copy slips, with clamps and a hinged plate or tablet slated on the outer face, so the writing may be done by pen or pencil.

A dynamo electric machine has been patented by Mr. Jose M. Rivera, of Buga, U. S. of Colombia. The object of this invention is to so construct machines that the armature can be rotated without the use of belts or gear wheels, and a greater or less number of machines can be coupled on one shaft, also to facilitate the winding of the armature and improve its general construction.

A quartz mill has been patented by Mr. Jacob G. Titus, of Elizabethtown, New Mexico. It consists of a tub having a circular trough in its bottom, a series of balls in said trough, a rotary plate or cover with groove corresponding to the trough and adapted to rotate on and with the balls, with a battery of stamps carried by the cover and dies for operating the stamps as the cover is revolved, the mill being made of detachable sections for convenient transportation.

A toy has been patented by Mr. Harmanus Zuydhoek, of Brooklyn, N. Y. It has a plate with holes to receive the operating strings or a pivot, and slots to receive wire gauze for inclosing a combustible compound, with a loose wire to enlarge the circle of fire, so the device may be operated as a sisser while being used as a buzz, without danger of setting the house or the operator on fire.

A wind engine has been patented by Messrs. David and William W. Shilling, of Troy, Ohio. This invention covers improvements in the frame and vanes, in the spider for shifting and holding the vanes in and out of the wind in [illegible] means for utilizing the power, either by rotary or reciprocating motion, through various novel features of construction and arrangement.

A pump for oil wells has been patented by Mr. James M. Sauner, of Bradford, Pa. The barrel has a lower plugged end, with a lateral opening below the valve chamber connecting with an external supplementary chamber also having a lower closed end, so made as to exclude gas, and that the pump will be less likely to take in sand than when the suction is lower down and at the lower end of the barrel.

A gate hinge has been patented by Eugenia A. Williams, of Des Moines, Iowa. The lower hinge is made with a swinging arm hinged to a plate attached to the gate post, and carrying a pin working in a socket cap attached to the lower rear corner of the gate, so the gate can be thrown out of plumb by moving the swinging arm, making a simple and durable self-opening gate.

A flaxseed separator has been patented by Mr. George Adams, of Sherburne, Minn. The frame has ends of unequal heights with guide recesses in its top cross bars, there being a sliding frame in these recesses with parallel plates attached thereto, with grooves, discharge spouts, a feed box, and other novel features, constituting a simple and convenient machine for separating mustard and other round seed from flaxseed.

A saw filing machine has been patented by Mr. John H. C. Winston, of Lynchburg, Va. It has reciprocating file holding frames, with jaws for holding the saw, and means for automatically feeding the saw transversely to the files, the clamp or jaws for holding the saw being combined with a spring arm for pressing the jaws together during the time the files act on the saw, and automatically releasing the jaws during the time the files make the return stroke.

A tricycle has been patented by Mr. Theophilus H. Paessler, of Malvern, Ohio. This invention covers improvements on a former patented invention of the same inventor relating to tricycles adapted to be propelled by either the feet or the hands of the rider, or by both working together. Another patent of the same inventor provides means for automatically returning the guide wheel into line when it is turned to either side, and means whereby the tricycle may have an extra set of propelling apparatus for the use of a second rider.

A structure for handling vicious animals, a stall, and a driveway for training horses are the subjects of three patents issued to Mr. Charles F. Shedd, of Fairfield, Neb. The first structure is designed more especially for handling the wild horses of the West, and consists principally of a long chute built of parallel walls and made continuous to entrance chutes or pens, with separating gate for grading or separating out the animals to be trained. The stall is a novel construction for harnessing vicious horses and for yoking wild and vicious cattle preparatory to breaking horses and cattle, while the third invention relates to a circular driveway, and vehicles, whiffletrees, etc., connected therewith, for training wild and vicious horses to the harness and saddle.

Business and Personal.

The charge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in next issue.

Notes & Queries

HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters, or no attention will be paid thereto. This is for our information, and not for publication.

References to former articles or answers should give date of paper and page or number of question.

Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all, either by letter or in this department, each must take his turn.

Special Information requests on matters of personal rather than general interest, and requests for **Prompt Answers by Letter,** should be accompanied with remittance of $1 to $5, according to the subject, as we cannot be expected to perform such service without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each.

Minerals sent for examination should be distinctly marked or labeled.

(1) W. S. H. asks: How is brilliantine made, such as is used by barbers for the mustache? Also, how is face powder made in block, for ladies' use? A. Among the various formulas given for brilliantine, we find the following:

Honey	1 fluid ounce.
Glycerine	½ " "
Cologne	½ " "
Alcohol	2 " "

Mix.

An enamel powder frequently used is made as follows: Take equal parts finely scraped talc or French chalk and pearl white; sufficient rouge or carmine to slightly tinge it. Mix. This mixture is used to conceal discolorations; and without the coloring, to whiten the skin. Cake magnesia is used to whiten the skin.

(2) L. A. R. Co. ask if there is any process of restoring vulcanized rubber to its former state, so that it can be used again to vulcanize. A. Old rubber that has become hard is softened in a very short time by putting it in a vessel with vapors of carbon disulphide. The action of carbon disulphide is, however, too powerful if it lasts too long, hence it must be taken out and put in the vapor of kerosene afterward. As a general thing, however, old vulcanized rubber is simply cut very fine and worked over with new rubber, thereby giving rise to a second and inferior quality of rubber. See SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 249, 251, and 252.

(3) E. S.—An infusion of quassia in water makes a protection against gnats, mosquitoes, etc.

(4) M. A. S. asks for a receipt for a mucilage that will stick paper so it can be easily separated if desired. A. No properly made adhesive possesses such a quality. Flour paste when carelessly made will often separate easily. You might try it. 2. Is a dollar bill issued in 1862 worth more than face value? If so, how much? A. It is worth no more.

(5) F. S.—Metallic zinc precipitates from solutions of tin chloride, in the presence of free acid, metallic tin in the shape of small gray scales or as a spongy mass. The operation is best conducted when an excess of hydrochloric acid is in the mixture. It is much easier and far simpler to prepare the "chloride of tin" by simply evaporating the solution to crystallization. See "Removing Tin from Tin Scraps," SCIENTIFIC AMERICAN SUPPLEMENT, No. 114.

(6) C. W. M.—Commercial white lead frequently contains barium sulphate, and sometimes chalk. The former may be detected by its insolubility in dilute nitric acid, and the latter by the nitric acid solution yielding a white precipitate with oxalic or dilute sulphuric acid after the solution has been treated with hydrogen sulphide in order to remove the lead. A pure white lead can always be purchased from a reliable dealer.

(7) W. J.—A boy 16 years old, whose voice is changing, should not exercise it sufficiently to cause fatigue until the change is complete. You cannot alter the natural quality of your voice except by cultivation, and it is generally considered best to confine yourself to the part your voice is best fitted for, that is, don't try to sing both base and tenor, or soprano and baritone, etc.

(8) H. B. R. asks for an ink black at the time of writing, but will disappear after a short time. A. Boil nutgalls in aqua vitæ, put Roman vitriol and sal ammoniac to it, and when cold dissolve a little gum arabic, and it will, when written with, vanish in twenty-four hours.

(9) H. L. B. asks: 1. What is the best method for procuring ozone for experimental purposes, in considerable quantities? A. Ozone is most abundantly produced by the action of electricity upon the air. Machines for this purpose have recently been devised, and are now for sale. Ozone is also generated when phosphorus is exposed to the action of moist air. 2. Has it ever been produced from nitrous oxide? A. Its production from nitrous oxide is not described by leading chemical authorities. 3. Can the statement of "compound oxygen" dealers, that it is absorbed in certain liquids which they vend, be true? A. Ozone is practically insoluble in water, and therefore we do not see how it can be a constituent of "compound oxygen."

(10) H. M. J.—The Great Eastern was begun in 1854 and completed in 1859 for passenger traffic. She was engaged in the laying of the second and third cables of 1865 and 1866, and was altered for the work then undertaken.

(11) W. V.—To ebonize wood use the following: Dissolve 4 ounces shellac with 2 ounces borax in ½ gallon water, boil until a perfect solution is obtained, then add ½ ounce glycerine; after solution add sufficient aniline black soluble in water, and it is ready for use.

(12) L. H. A. desires a formula for violin varnish. A. We suggest the following: Rectified spirits of wine, ½ gallon, add 6 ounces gum sandarac, 3 ounces gum mastic, and ½ pint turpentine varnish; put the above in a tin can by the stove, frequently shaking till well dissolved; strain and keep for use. If you find it harder than you wish, thin with more turpentine varnish.

(13) E. M. D. asks: 1. I have a small revolver which I want to silver plate; will you please give me a receipt that will answer my purpose? A. See the article on Electro Metallurgy in SCIENTIFIC AMERICAN SUPPLEMENT, No. 310. 2. Is it legal to sign your name to a promissory note with an indelible lead pencil? A. The law does not designate with what you shall write; anything which makes plain proof will do. 3. Can you give me a receipt for making red aniline ink? A. Dissolve 25 parts by weight of saffranine in 500 parts warm glycerine, then stir in carefully 500 parts alcohol and 500 parts acetic acid; dilute in 9,000 parts water containing a little gum arabic in solution. Or 1 part magenta in 150 to 200 parts hot water likewise forms a red ink used somewhat.

(14) P. B.—The sun enters the constellations of the zodiac in the order of their names, the same as the moon. The position of the sun in its relation to the constellations of the zodiac and the equinox and solstice was fixed in the early ages of astronomy, but by reason of the precession of the equinoxes for 2,000 years or more the sun has gone back in the signs, so that it is now about one sign behind its assigned place on the star maps. No stars have a parallax to the naked eye. It is very doubtful if the nebula in Ursa Major can be identified in a 2¼ inch telescope.

(15) F. J. W. desires a receipt for making ginger ale and sarsaparilla, such as is sold in bottles. A. For ginger ale see the receipt given in SCIENTIFIC AMERICAN SUPPLEMENT, No. 270, under title of "Effervescent Beverages." Sarsaparilla sirup is made as follows: Take oil of wintergreen 10 drops, oil of anise 10 drops, oil of sassafras 10 drops, fluid extract of sarsaparilla 2 ounces, simple sirup 5 pints, powdered extract of licorice ½ ounce, mix well. This can be diluted with water or charged with carbonic acid as you may desire.

(16) O. K. writes: 1. I would like a recipe for making a cement (with silicate of soda) for furnaces and stoves. A. This cement is prepared by mixing finely pulverized iron with silicate of soda to a thick paste, and then coating the cracks with it. The hotter the fire then becomes, the more does the cement melt and combine with its metallic ingredients, and the more completely will the crack become closed. 2. A recipe for making a glue for labeling on tin. A. See answer to query No. 21, in SCIENTIFIC AMERICAN, May 9, 1885.

(17) E. W. S. writes: Is there any way to take the taste of onions out of milk and butter? A. Make a strong solution of saltpeter, say a pint of boiling water upon an ounce of saltpeter, and, when thoroughly dissolved, put it in a bottle and stand in a cool place. Before milking put into the milk pail a spoonful of this solution or more according to the quantity of milk expected, and all vegetable flavor will be entirely destroyed. The same substance will also in a great degree destroy the bad flavor given to butter by various plants, etc.

(18) T. O. O.—A cement which is proof against even boiling acids may be made by a composition of India rubber, tallow, lime, and red lead. The India rubber must first be melted by a gentle heat, and then 6 to 8 per cent by weight of tallow is added to the mixture while it is kept well stirred; next day slaked lime is applied, until the fluid mass assumes a consistence similar to that of soft paste; lastly, 20 per cent of red lead is added, in order to make it harden and dry.

(19) L. W. writes: I want to finish a house inside with Georgia yellow pine and white or spruce pine doors and sashes. The yellow pine I want to finish with oil, so as to bring out the native grain, and the doors and sash I wish to stain say dark cherry or mahogany. A. The following is a commonly employed oil finish: Linseed oil 16 ounces, black resin 4 ounces, vinegar 4 ounces, rectified spirits 3 ounces, butter of antimony 10 ounces, spirit of salts 2 ounces. Melt the resin, add the oil, take it off the fire, and stir in the vinegar, let it boil for a few minutes, stirring it; when cool, put it into a bottle, add the other ingredients, shaking all together. For dark mahogany introduce into a bottle 15 grains alkanet root, 30 grains aloes, 30 grains powdered dragon's blood, and 500 grains 95 per cent alcohol, closing the mouth of the bottle with a piece of bladder, keeping it in a warm place for three or four days, with occasional shaking, then filtering the liquid. The wood is first mordanted with nitric acid, and, when dry, washed with the stain once or oftener, according to the desired shade; then the wood being dried is oiled and polished. A cherry stain is readily made by adding 4 ounces annatto to 3 quarts rain water; boil in a copper kettle till the annatto is dissolved, then put in a piece of potash the size of a walnut, keep it on the fire about half an hour longer, and it is ready to bottle for use.

(20) A. D. F. asks: 1. What preparation, and how made, can be used to clean, brighten, and properly restore kid shoes after they have been scratched or show the surface of kid worn off? A. Find some Judson's dyes the color you require, and dilute until desired shade is obtained. When dry, finish with glair, *i. e.*, the white of eggs whipped up and allowed to stand. The liquid is poured off, and this is the article required, or use the following: Take of bruised blue galls 4 ounces, logwood, copperas, iron filings, free from grease, and sumac leaves each 1 ounce. Put all but the iron filings and copperas into 1 quart good vinegar, and set the vessel containing them in a warm bath for twenty-four hours, then add the iron filings and copperas and shake occasionally for a week. It should be kept in a well corked bottle. It should be applied to faded spots with a sponge. It will restore the black color of leather when it turns red, the leather being previously well cleaned with soap and water. 2. What will remove a tarnish (greasy-like appearance) from a new nickel plated student's lamp? A. Polish with rouge.

(21) J. G. writes: I have a base ball made of (New York) plaster of Paris, 16 inches in diameter, containing the names of the clubs in the National League in three-sixteenths inch raised letters. The surface dirties very quick. I would like a receipt or coating that would keep off the dust and give it a marbized appearance. A. By a thin covering of water glass, a coating will be formed. Another method consists in first thoroughly drying the article in a warm dry atmosphere; then place it in a vessel and cover it with the clearest linseed oil, just warm. After twelve hours, take it out, drain, and let it dry in a place free from dust. When dry it will look like wax, and can be washed without injury.

(22) W. P. & Co. write: I have in my business occasion to cement large quantities of "Manila cardboard," and would like to have you give me a recipe for a cheap, light colored cement or glue having the following qualities: Quickness of tack and pliableness. A. A good glue insoluble in water may be prepared by soaking gelatine in cold water, dissolving it in glycerine, and then adding 2 ounces of tannin for every pound of gelatine used. Heat the mixture in a water bath until perfectly homogeneous and as free from excess of water as possible. It may be colored if desired. Melt when wanted for use if possible. See also SCIENTIFIC AMERICAN SUPPLEMENT, No. 158, in which numerous receipts, etc., will be found for cements of every description.

(23) M. A.—Madstones are said to be formations found in the bladders of deer, and only exist in those animals that live in a high and dry climate, where there is not a full supply of water and the water drank is impregnated with limestone. In plain English they are simply formations of calcium carbonate, and we do not believe that they will cure hydrophobia at all.—You will be unable to obtain sufficient power from batteries for the purpose of illuminating a dwelling house, except at a very high cost.—For preserving eggs see SCIENTIFIC AMERICAN SUPPLEMENT, Ne. 317, on "How to Preserve Eggs for the Market."—There are no practically successful street car motors to take the place of horses except steam, or possibly the cable system, as in Chicago and San Francisco, although in Berlin there is a line of railway run by electricity.

(24) B. B. writes: The hour and minute hand of a clock are exactly over each other at 12 o'clock; when are they next over each other? A. $5\frac{5}{11}$ minutes or 5 m. $27\frac{3}{11}$ seconds, after 1.

(25) H. A. L. desires a formula for a mucilage that will answer to stick labels on mineralogical specimens.

A.	Starch	2 drachms.
	White sugar	1 ounce.
	Gum arabic	2 drachms.
	Water	q. s.

Dissolve the gum, add the sugar, and boil until the starch is cooked.

(26) J. A. M.—Dynamite when ignited in the open air simply burns slowly away.

(27) J. A. L.—A No. 12 blacklead crucible is worth 55 cents. Chemical analysis must be resorted to in order to determine the constitution of minerals. Selenium may be separated from tellurium by treating a mixture of these two elements with potassium cyanide, giving rise to telluride of potassium and a cyanide of selenium. This test is described fully in Watt's "Dictionary of Chemistry." The behavior of tellurium ores has never been very perfectly investigated.

(28) J. J. & Co.—We cannot tell the ingrdients of the coating on the specimen sent without having it analyzed. A superior waterproof paper, transparent and impervious to fat, may be prepared by saturating good paper with a liquid prepared by dissolving shellac at a moderate heat in a saturated solution of borax. Such a mixture may be colored by the addition of various aniline dyes.

(29) J. B. asks (1) a receipt for a No. 1 harness polish. A. Alcohol 1 gallon, white turpentine 1½ pounds, gum shellac 1½ pounds, Venice turpentine 1 gill. Let them stand by the stove till the gum is dissolved, then add sweet oil 1 gill, and color as you wish with lampblack. 2. A receipt for a whitewash that will not crack or peel off the walls of the engine house or brick. A. The following receipt for whitewashing, sent out by the Lighthouse Board of the Treasury Department, has been found, by experience, to answer on wood, brick, and stone nearly as well as oil paint, and is much cheaper: Slake ½ bushel lime with boiling water, keeping it covered during the process. Strain it, and add a peck of salt dissolved in warm water, 3 pounds ground rice put in boiling water and boiled to a thin paste, ½ pound powdered Spanish whiting, and a pound of clear glue, dissolved in warm water; mix them well together, and let the mixture stand for several days. Keep the wash thus prepared in a kettle or portable furnace, and when used put it on as hot as possible with painter's or whitewash brushes. 3. Is there any difference in the time at which different electric alarms go off, for the same alarm on one circuit? We have two circuits connected with a four circuit repeater; we have left the question to you to decide. A. Practically the gongs all strike at once; but theoretically there is a difference, that gong which is furthest off striking last. The difference in time cannot be measured, it is so infinitely small.

(30) F. E. asks: 1. Is there such a thing as unfermented wine? If so, what is used to prevent fermentation? A. The pure juice of the grape is unfermented wine. Sulphite of lime is frequently employed to arrest fermentation. 2. If cider is boiled direct from the press, will the boiling prevent its fer-

mentation, and be consequently non-intoxicating? A. No; more or less fermentation is likely to occur. Cider is only intoxicating in consideration of the amount of alcohol it contains.

(31) De W. C. K. writes: I have two pieces of convex glass, one 10x12 and one 8x8. I wish to coat them with something so as to make a looking glass. What is the quickest way of doing it? A. Lead and tin of each 2 ounces, bismuth 2 ounces, mercury 4 ounces. Add the mercury to the rest in a melted state, and remove from the fire; mix well with an iron rod. This amalgam melts at a low heat, and is employed for silvering convex mirrors, etc. The glass being well cleaned, carefully warmed, and the amalgam rendered fluid by heat is poured in and the vessel turned round and round, so that the metal may be brought in contact with every part of the glass which it is desired to cover. At a certain temperature this amalgam readily adheres to the glass.

(32) L. A.—The following is one of the popular receipts for making mead for a summer drink: 1 pound of Spanish sarsaparilla; boil 5 hours and strain off 2 gallons, add sugar 16 pounds and tartaric acid 10 ounces. Half a wineglass to half a pint tumbler of water and half a teaspoonful of soda is a fair proportion for a drink. See also list of "Summer Beverages," contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 142, and the "Effervescing Beverages," given in SCIENTIFIC AMERICAN SUPPLEMENT, No. 270.

(33) A. P. F.—To clean silver, mix two teaspoonfuls of ammonia in a quart of hot soap suds. Put in the silver ware and wash it, using an old nail brush or tooth brush for the purpose. 2. Caustic soda is the article generally used. The amount to be used depends upon the variety or kind of soap you desire to make, hard or soft, and fat you have at your disposal.

(34) H. R. S. asks how to make fish glue so it can be used cold and be waterproof without injuring it much. A. White lead added to glue is said to make it waterproof as well as to strengthen it. Potassium bichromate, when added in proportion of about 2 per cent and the glue exposed to the light, causes it to become insoluble. We can send "A Practical Treatise on the Raw Materials and Fabrication of Glue, Gelatine," etc., by F. Dawidowsky. Price $2.50.

(35) W. W. A. writes: I wish to ascertain the process of manufacture of the common chalk or school crayon—not the materials of which it is composed, but the machinery used in its manufacture and the different processes through which it goes to completion. A. The crayons consist of equal parts of washed pipe clay and washed chalk mixed into a paste with sweet ale made hot, into which a chip or two of isinglass has been dissolved. This paste is rolled out with a rolling pin, cut into slips, then rolled into cylinders by means of a small piece of flat wood, cut into lengths, and finally placed in a slow oven or drying stove until hard.

(36) N. C. R. asks what to put with pine tar to make a chewing gum. Something that would be healthy to chew a great deal of. A. The following process is used in Maine: Large quantities of the gum are purchased from the lumbermen and gum hunters for the purpose of refining it, as they say. But as a general thing, the refining consists in adulteration with rosin. They throw it into a big kettle, bark and all, and boil it to about the consistency of thick molasses, skimming the impurities off as they rise to the surface. Then, if the purpose be to adulterate, some lard or grease and a lot of rosin is added, and in some cases a little sugar. The mixture then becomes thicker, and, after more stirring, is poured out on a slab, where, while it is yet hot, it is rolled out in a sheet about a quarter of an inch thick, and then chopped with a steel die into pieces half an inch wide and three-quarters of an inch long. These pieces are wrapped in tissue paper and packed in wooden boxes. There are 200 pieces in a box. Some gum is treated in this way without adulteration.

(37) J. R. N. asks a cement for stopping a cavity in bottom of a canoe dug out of a poplar tree. A. After you have plugged the hole up, fill the interstices and coat the outside with a cement consisting of shellac 4 ounces, borax 1 ounce; boil in a little water until dissolved, and concentrate by heat to a paste.—The best means of preserving posts consists in charring them and then coating with tar.

(38) C. W. H. writes: Chlorine is generated by the action of dilute sulphuric acid in chloride of lime. It possesses a more pungent odor, we think, even than sulphur. We would recommend you to consult the article on "Disinfectants and their Special Application," contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 162.

(39) M. W. W. writes: I have a photograph that I would like to color, but the colors run off, it seems owing to oil upon the picture. How can I get it off? A. There should be no oil on the surface of the photograph. It frequently happens that the face of the picture is coated with a colorless varnish, but this will readily wash off, whereupon the paints or water colors are mixed with ox gall and applied direct.

(40) Casaref.—The Louisiana Fiber Making Company, of New Orleans, La., own and control the only process by which bagasse can be readily and economically decorticated and prepared for the pulp mill. The New Orleans *Daily Picayune* of May 15, 1884, was printed on such paper. The process requires machinery similar to that used in the manufacture of the chemical wood pulp. An experienced and intelligent superintendent is more essential than able workmen. The Swedish filtering paper is composed of flax fiber, and the fibers are very much crushed and broken. The linen pad evidently did duty elsewhere in the rag before it found its way into the paper. The fibrillæ of the broken fibers serve to fill up the pores, and prevent solids passing through the paper. Only the purest materials are used in the manufacture of Swedish filter paper. Its small amount of ash is its chief characteristic.

(41) S. asks: Does a human being weigh more after consuming two pounds of solid food than before? A. Weighs 2 pounds more.

(42) J. R. E. asks: What city on the earth has no horses? A. Venice, Italy.

(43) F. P. S.—Nickel melts at upward of 3,000° C.—Water gas is a mixture of nearly equal parts of hydrogen, carbon monoxide, and marsh gas with about 15 per cent of illuminants. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 398.

(44) G. P.—We do not believe any horse ever made such distances in the time as were made by the competitors in the recent walking match.

(45) G. W. S.—The smallest engine and boiler on the market is 1 horse power, price $200 complete. Locomotive engineering is perhaps as good a trade as any. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 341, for the dimensions and weight of the largest locomotives. Also SCIENTIFIC AMERICAN SUPPLEMENT, No. 286, for illustrated description of a 1,000 horse power Corliss engine.

(46) N. R. W.—Cast iron cannot be welded to cast iron with any practical benefit. The Chinese method of burning is only a curiosity. It may also be sweated together by heating the pieces in contact to nearly their melting point with a flux of caustic soda.

(47) M. M.—The sun in its general influence upon the atmosphere may indirectly influence the draught of chimneys. The relative position of the roof in regard to prevailing winds probably has a larger influence than the sun. The heat of the fire and height of chimney determine the draught. It has been found economical to burn culm or screenings for many uses; good draught and a fine grate are requisite.

(48) J. G. P.—A corrugated iron roof should be lined to prevent sweating, in places where the air is liable to become moist, or where many persons are congregated. Cover the frame with matched boards, then lay the corrugated iron.

(49) C. F. M. desires a good receipt for curing natural flowers by immersion or dipping. A. Dip the flowers in melted paraffin, withdrawing them quickly. The liquid should be only just hot enough to maintain its fluidity, and the flowers should be dipped in one at a time, held by the stalks, and moved about for an instant to get rid of air bubbles. Fresh cut flowers free from moisture make excellent specimens in this way.

MINERALS, ETC.—Specimens have been received from the following correspondents, and examined with the results stated.

C. H. D. & Co.—The specimen is principally quartz, with possibly a small quantity of serpentine mixed with it, producing the green color.—T. J. W.—The specimen appears to be an excellent quality of fire clay. Nothing positive concerning its value can be determined until it has been burned. It is not likely to be marketable in New York, on account of the excellent deposits situated in New Jersey.—D. W. S.—Ochers themselves are clays containing varying amounts of iron oxide. The specimen sent is an ocher in the sense that it is a clay colored by iron oxide, but it is a very poor variety, for it is principally clay.—E. G. L.—The specimen is hematite (iron peroxide), and appears to be a valuable ore of iron. The expense of analysis would be $15.00.—W. S. R.—The specimen is limestone, and contains no metal apparently.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted,

June 23, 1885,

AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.]

Adjustable chair, W. E. Burk 320,844
Air compressing and storing apparatus, C. Leavitt 320,482
Air ship, J. S. Foster 320,548
Alarm. See Burglar alarm.
Amalgamating apparatus, W. E. Koch 320,565
Animals, structure for handling vicious, C. F. Shedd 320,710
Axle, car, Decker & Trombly 320,855
Axle tool, A. W. Bartholomew 320,748
Bale heading and lifting attachment for presses, S. B. Steers 320,715
Balloons, portable gas generator for filling, C. E. Myers 320,885
Ballot box, J. H. Laskey 320,803
Battery. See Medical battery.
Bed bottom, spring, J. Alexander 320,832
Bed bottom, spring, J. R. Deihm 320,765
Bed, folding, L. C. Boyington 320,837
Bed lounge, R. H. Bryant 320,623
Bed, sofa, W. Ott 320,676
Bed, spring, T. H. Halliday 320,552
Bed, spring, J. Newhouse 320,493
Bedstead slat fastening, W. B. Abrams 320,741
Beer, apparatus for attemperating or cooling, D. Boyle 320,618
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Boneblack drier, E. P. Eastwick 320,642
Book, check, J. C. Hall 320,782
Book cover, removable, J. M. Bronson (r) 10,615
Boot or shoe, W. C. Gillman 320,468
Boots and shoes, machine for uniting soles to uppers of, F. Chase 320,849
Bottle, siphon, T. Bergmann 320,751
Bottle stopper, J. Byrne 320,457
Bottle stopper, W. L. Roorbach 320,701
Bottles, etc., closing apparatus for, H. Spriegel 320,715
Bottles, machinery for drilling holes in, D. Rylands 320,505
Box. See Ballot box. Jeweler's dust box. Oil expressing box.
Brake. See Car brake.
Brick and tile machine, F. E. Frey 320,865
Bridge, C. D. Dundas 320,859
Broiler, A. M. L. Mathioly 320,668
Broiler or toaster, M. G. Barbour 320,529
Bucket, well, J. S. Arnold 320,835
Buckle and trace carrier, combined pad, O. Mallory 320,569
Burglar alarm, W. Goldspohn 320,871
Burglar alarm, A. Jacobi 320,660
Burglar alarm, M. Pratt 320,686
Burial case, J. J. Finley 320,861
Bush, tap hole, A. Fischer 320,862
Button, E. J. Howe 320,874
Button cover or sheath, T. F. Walter 320,730
Button fasteners, machine for feeding, F. H. Richards 320,503
Button fastening, G. W. Washburn 320,517
Button, link sleeve, T. W. F. Smitten 320,596
Button or stud, J. Costello 320,761
Buttoner, shoe, J. L. Sommer 320,714
Cable grip, D. B. Anders 320,744
Caisson or crib, J. McGovern 320,671
Can. See Oil can.
Car brake, W. H. Mason 320,573
Car coupling, N. B. Eccleston 320,767
Car coupling, J. E. Mazelin 320,669
Car coupling, J. A. Ross 320,702
Car, fluid, J. R. Gathright 320,775
Car followers, machine for forming, H. Rhyn 320,502
Car motor, tram, Danks & Barnes 320,634
Carbons, machine for dressing, W. J. Possons 320,497
Carbureter, F. Copeland 320,460
Card clothing, device for stretching, G. E. Kimball 320,795
Carding machine condenser, W. Gill 320,778
Carpet lining, J. H. Beale 320,615
Carpets, plush, etc., cleaning compound for, T. W. Ford 320,772
Carrier. See Cash carrier. Cash and message carrier. Hay carrier. Trace carrier.
Case. See Burial case. Display case.
Cash and message carrier, F. A. Byram 320,846
Cash carrier, R. F. Gibson 320,777
Casting ingots of alternate layers of metal, J. Illingworth 320,560
Centrifugal machine, A. L. Sieghortner 320,595
Chair. See Adjustable chair. Dental chair. Nursery chair.
Chair, C. Closterman 320,629
Chalk line reel, H. F. Haslam 320,555
Chimney cap and ventilator, W. J. & C. Kayser 320,794
Chimney cowl, G. W. Powers *et al* 320,815
Chimney top and ventilator, W. P. Wilson 320,608
Circuit closer, J. E. Root 320,504
Cleaner. See Feed water cleaner. Sink cleaner.
Cloth, leather, etc., machine for cutting, C. Goettler 320,650
Clothes rubbing pad, W. S. F. Dillon 320,856
Cocoa beans, apparatus for hulling, assorting, and cleansing, H. Stollwerck 320,890
Coffee and tea pot, W. T. Jones 320,561
Coffin fastening device, S. A. Argerbright 320,834
Coking coal, Chambers & Smith 320,627
Collar fastening, horse, Fisher & Burgess 320,646
Collar, horse, E. Fisher 320,863
Combustion of liquid fuel, apparatus for the, J. D. Bodwell 320,532
Combustion of liquid fuel, device for the, J. D. Bodwell 320,533
Compass, mariner's, R. L. Sleater 320,823
Condenser, steam, T. Barber 320,746
Condenser, surface, T. Gannon 320,647
Cooler. See Water cooler.
Cordage, preparation, manufacture, and treating of yarn, hemp, and other materials employed in the manufacture of, M. H. Day 320,763
Cotton gin, A. J. Vandegrift 320,901
Coupling. See Belt coupling. Car coupling. Pipe coupling. Thill coupling.
Cradle rocker, automatic, E. Anderson 320,833
Crib, folding, M. E. Woodward 320,830
Crib, settee, and lounge, S. Hale 320,651
Crusher. See Rock crusher. Seed crusher.
Crutch, J. R. Brooks 320,621
Cultivator, W. S. Weir 320,519
Cultivator, A. Wilhelm 320,607
Cultivator and hoe combined, cotton, R. L. Warthen 320,731
Cultivator gearing, F. L. Holcomb 320,787
Cultivators, etc., guiding device for, S. P. Hutchinson 320,473
Cupola furnace having sectional water jackets, E. Probert 320,586
Cutter. See Malt cutter. Stalk cutter.
Dental chair, M. L. Long 320,806
Designs on britannia and other soft metals, producing ornamental, J. W. Tufts 320,513
Display case for goods, J. N. Leonard 320,566
Door check, W. Bahre 320,527
Draught equalizer, G. J. Kaplan 320,793
Drain and drain tile, F. M. Marquis 320,667
Drier. See Boneblack drier. Fruit drier. Tobacco drier.
Drier, W. J. Possons 320,498
Dyeing, R. Silberberg 320,820
Ear pick, J. Ruoff 320,889
Electric conductor, L. Daft 320,632
Electric lock, C. Blattmann 320,617
Electric machine regulator, dynamo, C. L. Buckingham 320,840, 320,842
Electric machines, armature for dynamo, A. H. Bowman 320,754
Electric switch, L. Daft 320,630
Electrical conductors, making, W. S. Platt 320,684
Electro-magnetic reciprocating engine, C. J. Van Depoele 320,515
Elevator. See Hay elevator.
Elevator, Babbott & Roberts 320,745
Elevator bucket, W. H. & W. J. Clark 320,760
Elevator bucket, C. M. Thomas 320,897
Engine. See Electro-magnetic reciprocating engine. Rotary steam engine. Steam engine. Traction engine.
Engine cylinder and valve, G. S. Strong 320,893
Explosive compound, R. S. Penniman 320,583
Faucet, etc., M. Fitzgerald 320,770
Faucet, P. Schofield 320,705
Faucet, registering, L. C. Lane 320,480
Feather renovator, O. S. Crane 320,540
Feed water cleaner, F. Trowbridge 320,511
Felly dressing machine, W. Gardner 320,467
Fencing, die for making barbed metallic, A. P. Thayer 320,825
File and cutting the same, W. Tucker 320,899
Filtering tank, A. Doughton 320,545
Firearm, W. H. Davenport 320,637
Fire escape, M. B. Ingersoll 320,474
Fire escape, O. G. Lee 320,664
Fire escape and elevator, C. R. S. Curtis 320,854
Floor coverings, apparatus for uniting wood for, H. Beisheim 320,616
Floor coverings, etc., apparatus for uniting wood for, C. E. Rider 320,696
Flooring tile, wood, C. E. Rider 320,698
Flooring, wood, C. E. Rider 320,697
Flour bolts and middlings purifiers, conveyer for, F. J. Schupp 320,707
Flower pot, S. J. Rhoads 320,588
Freezing cream, etc., machine for, A. W. Marshall 320,572
Fruit drier, J. R. Dew 320,543
Fruit drier, M. B. Miller 320,883
Fruit jar, C. Newman 320,580
Funnel, P. C. Stadler 320,716
Furnace. See Blast furnace. Boiler furnace. Cupola furnace. Portable furnace.
Furnace, W. Kent 320,563
Furnaces, feeding air to, W. Wright 320,903
Game indicator for pool tables, electrical, E. Curtis 320,542
Gas burners, electrical lighting device for, L. S. White 320,606
Gas extinguisher, Rice & Currey 320,694
Gas mains, leak detector for, J. J. Ricketts 320,695
Gas producer, J. Henderson 320,873
Gas tight expansion joint, D. Jarves 329,661
Gate, G. Bristol 320,534
Gate, P. T. Keegan 320,662
Gate, Leitzel & Frock 320,805
Gearing, belt, W. N. Whiteley 320,734
Glass and other furnaces of the regenerator type, E. Walsh, Jr 320,516
Gluing and staining machine, W. Rabbe 320,816
Gold and silver from pulverized ores, machine for extracting, J. L. Hayward 320,655
Governor, steam, J. Killip 320,478
Governor, steam power, C. V. Lude 320,879
Grain granulating machine, G. Malcolm 320,486
Grate, J. F. Hess *et al.* 320,783
Grinding tools, machine for, N. Brickell 320,755
Gun barrels, straightening and annealing, C. E. Bailey 320,613
Gun, magazine spring, S. D. Engle 320,643
Gun wad, C. R. Pue 320,500
Hame and clip for harness, C. & F. C. Stoetzel 320,600
Harness attachment, G. L. Eason 320,546
Harness straps, machine for channeling, T. K. Clark 320,628
Harrow, M. D. Bronner 320,455
Harrow, P. Gales 320,773
Harvester bundle dropper, A. H. Bell 320,750
Hat sizing machine, S. C. Palmer 320,581
Hay carrier, R. C. Jordan 320,876
Hay elevator and carrier, R. L. Short 320,594
Hay rake, horse, R. W. Dixon 320,766
Hay raking and loading machine, G. A. & D. R. Stedman 320,598
Heating apparatus, portable, C. D. P. Gibson 320,648
Hinge, spring, D. W. Housley 320,789
Hoisting machine, A. Pugh 320,886
Holder. See Paper holder. Pencil holder. Rein holder.
Hook. See Ice hook.
Hoop or band for barrels, etc., J. W. Weston 320,732
Horses, driveway for training, C. F. Shedd 320,712
Horseshoe and horseshoe blank, T. H. Heard 320,471
Hose carriage, S. R. McLaughlin 320,489
Hose, sleeve, and garment supporter, C. J. Haley 320,470
Hot air and steam for [illegible] power, apparatus for combining, Fenton & Bennet 320,768
Hydrocarbon vapor burners, generator for, A. M. Brainard 320,838
Ice hook, Palmer & Kidder 320,680
Ice shaver grip, H. G. Carnell 320,624
Incubators, egg turning device for, L. Cutting 320,463
Incubators, heat regulating device for, J. K. Meschter 320,490
Index book, W. M. Kinnard 320,798
Induction coil, W. Stanley, Jr 320,717
Ingots, apparatus for treating metal, J. Gjers 320,779
Ingots, treating steel, J. Gjers 320,780
Insulating pipe union, C. H. Fischer 320,645
Insulator for tracks, L. Daft 320,631, 320,633
Ivory, plastic compound resembling, G. M. Mowbray 320,884
Jack. See Wheel jack.
Jeweler's dust box, J. A. Sherwood 320,593
Joint. See Gas tight expansion joint. Spring joint.
Key. See Watch key.
Key ring, G. W. Jopson 320,792
Knitting machine, J. Bradley 320,619
Knob attachment, G. Van Winkle 320,602
Ladder, folding, J. Ready 320,692
Lamp burner, J. B. Underwood 320,726
Lamp, electric arc, C. L. Buckingham 320,841, 320,843
Lamp, electric arc, G. Pfannkuche 320,585
Lamp, incandescent, Yunck & Stuertz 320,739
Lamp, stand, N. Jenkins 320,476
Lantern, magic, H. & G. Davenport 320,636
Latch and lock combined, W. Hill 320,472
Latch, lever, J. J. Maas 320,485
Latch or check, door, M. P. Ismay 320,790
Lathe drifting device, J. Hall 320,652
Leaching solutions, purifying hyposulphite, E. H. Russell 320,590
Leggin, C. E. Hosmer 320,557
Level, plumb, C. Schofield 320,506
Level, spirit, B. B. Butt 320,537
Lock. See Electric lock. Sash lock.
Lock, C. E. Whittlesey 320,521
Locomotive cow catcher, J. Fleck 320,864
Locomotive pilot, F. B. Hoesl 320,657
Log turner, D. J. Saltsman 320,591
Logwood extract, preparing, C. E. Avery 320,526
Loom positive shuttle motion, F. K. Wright *et al.* 320,902
Loom shuttles, machine for winding bobbins for, J. H. Crowley 320,851
Lubricator, S. G. Cabell 320,538
Lubricator, P. L. Schmitt 320,703, 320,704
Malt cutter and vegetable crusher, combined, E. Kauffeld 320,877
Map, chart, relief, etc., relief, L. R. Klemm 320,564
Measuring and elevating grain, machine for, S. R. Daxon 320,465
Measuring and fitting device, garment, W. B. Pollock 320,496
Measuring vessel, graduated, J. J. Hicks 320,784
Mechanical movement, H. Schulze-Berge 320,706
Medical battery, O. Flemming 320,547
Meter. See Water meter.
Mill. See Windmill.
Mill machinery feeder, R. M. Nake 320,811
Mills, etc., feeding mechanism for, P. Fuchs 320,867
Mixing white lead with oil, W. H. Pulsifer 320,887
Moulding, E. Fillmann 320,644
Monument, A. McKellar 320,488
Mordant, R. Silberberg 320,821
Mortises, tool for removing chips from, G. Winzenried 320,736

Motor. See Car motor. Wind motor.
Necktie fastening, G. E. Mitchell ... 320,491
Nozzle and faucet, R. Marsh ... 320,881
Nursery chair and carriage, V. Rathknecht ... 320,587
Nut machine, S. H. Markham ... 320,571
Oil can, W. H. & W. J. Clark ... 320,759
Oil expressing box, R. S. Cathcart ... 320,847
Oil expressing box, Sullivan & Hazard ... 320,896
Oil expressing box package shaping machine, R. S. Cathcart ... 320,848
Oil tank, S. Van Antwerp ... 320,514
Ointment, D. H. Bisaillon ... 320,836
Ore separator, W. L. Card ... 320,756
Oven, portable, W. H. H. Knight *et al* ... 320,801
Packing for rock drills, piston head, L. S. Woodbury ... 320,829
Packing, piston rod, W. Augustus ... 320,525
Packing, piston rod, W. H. Prince ... 320,688
Pad. See Clothes rubbing pad.
Pail, dinner, W. Bord ... 320,454
Pantaloon protector, F. R. Hogeboom ... 320,658
Paper fabric, re-enforced, J. H. Beale ... 320,614
Paper folding machines, trimming device for, J. H. Stonemetz ... 320,891
Paper holder, toilet, A. A. Myers ... 320,576
Paper pulp engines, bed plate for, F. S. Taylor ... 320,721
Paving sidewalks, J. H. Duke, Jr ... 320,858
Peanut roaster, T. Lee ... 320,804
Pen, fountain, C. W. Taylor ... 320,509
Pencil holder, J. C. Wilkes ... 320,828
Piano, upright, C. M. Hattersley ... 320,556
Pipe. See Blow pipe.
Pipe coupling, C. Phillis ... 320,683
Pipe coupling, G. A. Daudt ... 320,635
Pipe coupling, E. W. Wolfe ... 320,738
Pipe joint protector, B. Ford ... 320,771
Pipe wrench, J. F. Guthrie, Jr ... 320,872
Piston. P. Brotherhood ... 320,839
Plaiting apparatus, O. T. Raney ... 320,689
Planing machine, wood, Feyh & Murphy ... 320,769
Planter, check row, corn, Cruzan & Cargay ... 320,852
Planter check rower, corn, J. H. Montgomery ... 320,673
Plow, R. H. Adair ... 320,611
Plow, W. H. Hodgson ... 320,656
Plow, J. D. Lefevre ... 320,481
Plow, rotary, H. H. Cumback ... 320,853
Pocket protector, McCrystal & Siegfried ... 320,882
Poke, animal, S. M. Moore ... 320,492
Portable furnace, W. H. H. Knight ... 320,799, 320,800
Pot. See Coffee and tea pot. Flower pot.
Pottery ware, press for forming articles of, Crossley & Cook ... 320,541
Power, device for transmitting, W. H. Dodge ... 320,544
Protector. See Pantaloons protector. Pipe joint protector. Pocket protector.
Pulley or wheel, F. A. Jacobs *et al* ... 320,475
Pulp from paper, process of and machinery for preparing, Allen & Mason ... 320,612
Pulp into vessels of various kinds, machine for forming, G. M. Stevens ... 320,720
Pump, J. Wock ... 320,737
Pump barrel, chain, C. H. Miller ... 320,672
Pump, India rubber, P. J. Ruffel ... 320,888
Pumps, valve gear for direct-acting steam, J. C. Dean ... 320,754
Punch, ticket, W. Hill ... 320,785
Rack. See Sheep rack.
Rack or fire hose holder, R. Vose ... 320,727
Radiator valve, W. B. Patton ... 320,813
Rail chair, G. W. Jaques ... 320,791
Railway carriage, J. F. S. Thornhill *et al* ... 320,601
Railway, electrical, W. Painter ... 320,679
Railway gate, Way & Hill ... 320,827
Railway rail joints, fastening fish-plates in, T. A. Davies ... 320,639
Railway rail joints, fish-plates for, T. A. Davies ... 320,641
Railway rail joints, fulcrum metallic spring washer for, T. A. Davies ... 320,640
Railway rail, securing fish-plates to, T. A. Davies ... 320,638
Railway tracks, construction of, T. H. Gibbon ... 320,869
Railway switch, D. H. Valentine ... 320,900
Rake. See Hay rake.
Rake, J. P. Stabler ... 320,597
Rakes, making, F. S. Kretsinger ... 320,479
Reel. See Chalk line reel.
Reflector, J. R. Park ... 320,494
Refrigerator, J. Koch ... 320,802
Refrigerator, W. J. Taylor ... 320,722
Regulator. See Electric machine regulator. Timepiece regulator.
Rein attachment, check, W. W. Thompson ... 320,724
Rein fastener, check, W. A. Wales ... 320,728
Rein holder, G. O. Teeter ... 320,723
Ring. See Key ring.
Roaster. See Peanut roaster.
Rock crusher, C. W. Huson ... 320,559
Roofing, C. H. Starr ... 320,508
Rotary steam engine, L. H. Timmons ... 320,725
Rowing apparatus, W. Ciencoski ... 320,458
Saddle, riding, T. J. Wint ... 320,522
Sash fastening, H. T. King ... 320,796
Sash lock, T. E. Gilmore ... 320,551
Sash lock, T. R. Nichols ... 320,675
Saw, circular, W. J. Perkins ... 320,681
Saw filing machine, J. H. C. Winston ... 320,735
Saw guide, Gardiner & McAuley ... 320,550
Saw set, J. A. Borthwick ... 320,753
Sawing stair rails, guide for, S. Burnell ... 320,845
Scale, counter, A. Gerdum ... 320,776
Scraper and elevator, earth, J. H. & C. Haman ... 320,553
Screw plate, G. L. Reece ... 320,693
Screw threads, cutting, O. Bryant ... 320,536
Seal, E. J. Brooks ... 320,904
Seal trap for wash basins and water closets, automatic, W. D. Schuyler ... 320,708
Seed crusher, cotton, T. A. Perry ... 320,682
Seed separator, flax, G. Adams ... 320,831
Separator. See Ore separator. Seed separator.
Sewing machine, C. Lenz ... 320,666
Sewing machine, R. D. Tucker ... 320,898
Sewing machine buttonhole attachment, S. J. Baird ... 320,528
Sewing machine embroidering attachment, F. H. Chilton ... 320,758
Sewing machines, spring take-up for wax thread, Drumm & Wyker ... 320,857
Shaft straightening machine, A. Wood ... 320,610
Sheathing for buildings, D. S. Chesebro ... 320,757
Sheep rack, S. Gillogly ... 320,649
Sheet metal bending machine, C. C. Hare ... 320,653
Shingles for painting, apparatus for holding, W. W. Robinson ... 320,589
Ships, apparatus for cleaning submerged parts of, A. D. Spier ... 320,824
Shoemaker's rasping tool, T. S. Wheatley ... 320,733
Shoe, swimming, J. A. Couper ... 320,762
Shutter, inside, W. A. Holbrook ... 320,786
Signal. See Train signal.
Silk reeling machines, cocoon holder for, E. W. Serrell, Jr ... 320,709
Sink cleaner, F. E. Allen ... 320,742
Skate, roller, S. D. Castle ... 320,626
Skate roller, W. Gardner ... 323,744
Skates, anti-friction bearing for roller, W. S. Harmon ... 320,554
Skater's appliance, W. J. Cowing ... 320,462
Sled, C. H. Weisgerber, Jr ... 320,520
Sleeve, hose, and garment supporters, attachment for, C. J. Haley ... 320,469
Soldering machine, can, F. M. Leavitt ... 320,663
Spark extinguisher, G. D. Hunter ... 320,875
Spectacles and watchmaker's eyeglass, combined, G. H. Hull ... 320,558
Speed changing device, J. S. Price ... 320,687
Spreading tool for machines for coating fabrics with plastic material, A. C. Barstow ... 320,530
Spring joint for hooks, etc., W. H. Walker ... 320,729
Square, carpenter's, W. Steers ... 320,718
Stalk cutter, J. K. Patterson ... 320,812
Stall, C. F. Shedd ... 320,711
Stamp, W. S. Sharpneck ... 320,818
Stave jointing machine, H. D. Barnes ... 320,747
Steam engine cylinder, G. S. Strong ... 320,894
Steam engine, oscillating, E. L. Moore ... 320,575
Steel and steel coating wrought iron, making refined cast, T. Sheehan ... 320,819
Steering canal boats, C. McCabe ... 320,670
Steering gear of vessels, lock for, G. H. Taylor ... 320,510
Stereotype plates, impression sheet for making, C. A. Skene ... 320,713
Still, combined beer and spirit, Brown & Sipf ... 320,535
Stool and like articles, piano, W. A. C. Matthie ... 320,487
Stopper. See Bottle stopper.
Stove, Brigden & Cannon, Jr ... 320,620
Stove, cabinet gasoline, F. C. Rawlings ... 320,691
Stoove, cooking, G. R. Prowse ... 320,499
Straightening round bars, machine for, Beauregard & Wheelock ... 320,531
Stud and necktie holder, combined collar, C. Babcock ... 320,452
Sunshade, A. Lyon ... 320,568
Supporter. See Hose, sleeve, and garment supporter.
Switch stand, F. W. Snow ... 320,507
Tank. See Filtering tank. Oil tank.
Tanning, E. S. Ward ... 320,603
Thermometer, air, G. T. Beilby ... 320,749
Thill coupling, Holzbog & Weicksler ... 320,659
Thill coupling, N. Richey ... 320,817
Thrashing machine concave, G. A. Roberts ... 320,700
Ticket or stamp box, car, I. G. Pollard ... 320,814
Tile, P. Simons ... 329,822
Tile setting, A. H. Lord ... 320,567
Timepiece regulator, A. Junghans ... 320,562
Tire tightener, M. Chase ... 320,850
Tobacco drier, R. W. Coffee ... 320,459
Toy or game, mechanical, Reed & Walsh ... 320,501
Trace carrier, M. B. Frisbie ... 320,549
Traction engine, A. C. Ames ... 320,743
Traction engine, E. M. Birdsall ... 330,752
Traction engine reversing gear, I. Lehmer ... 320,665
Train signal, Parrish & Munn ... 320,495
Trap. See Seal trap.
Trestle, G. W. Murray ... 320,674
Tricycle, T. H. Paessler ... 320,677, 320,678
Truck, J. Esch ... 329,860
Trunk, C. Zimmerman ... 320,740
Truss, A. R. Bassett ... 320,453
Twist drills, machine for making, F. Buchter ... 320,456
Unwinder, thread, L. R. Hopkins ... 320,788
Valve, C. T. Lormor ... 320,807
Valve and faucet, R. Marsh ... 320,880
Valve, balanced slide, F. M. Stevens ... 320,599
Valve for engine cylinders, automatic waste, W. R. Townsend ... 320,826
Valve motion, G. S. Strong ... 320,895
Valve operating mechanism, G. S. Strong ... 320,892
Varnish, W. E. B. Davies ... 320,464
Vehicle drop perch, H. W. Pell (r) ... 10,616
Warp sizing machine, A. P. Dickinson ... 320,466
Watch, breastpin, D. Goldsmith ... 320,870
Watch case bezel, C. V. Peyn ... 320,584
Watch key, D. Roberts ... 320,699
Watch winding device, A. G. Wiseman ... 320,609
Water closet cistern, P. Carney ... 320,625
Water cooler and filter, combined, J. Lindle ... 320,483
Water cooler and refrigerator, J. Lindle ... 320,484
Water meter, oscillating, L. H. Nash ... 320,577 to 320,579
Waterproof fabrics, manufacturing, F. E. Hall ... 320,781
Water tube boiler, E. J. Moore ... 320,809
Wheel jack, J. F. Johnson ... 320,477
Wind motor, T. J. Harrison ... 320,654
Windmill, J. Marcus ... 320,570
Window, Millard & King ... 320,808
Wire feeding mechanism, S. L. Worsley ... 320,523
Wire, machine for making looped twisted, Panse & Klotz ... 320,582
Wood grinder, E. F. Millard ... 320,574
Wood ornamentation, G. A. Watkins ... 320,518
Wrench. See Pipe wrench.
Wrench, H. T. King ... 320,797
Yoke, neck, A. B. Arnold ... 320,524

TRADE MARKS.

Balsam or salve, V. L'Eplattenier ... 12,338
Boots, shoes, and slippers, A. J. Cammeyer ... 12,334
Drawing materials, E. G. Soltmann ... 12,340
Hominy, crushed, Austin, Nichols & Co ... 12,330
Liniment, J. F. Ballard ... 12,331
Medicine for the cure of impure blood or deranged bowels, liquid, A. Danner ... 12,335
Ointment or cosmetic, F. C. Renner ... 12,339
Paint, prepared, Hartmann, Le Doux & Maecker ... 12,336
Paper, white or light colored printing, writing, and wrapping, J. W. Butler Paper Company ... 12,333
Remedy for catarrh, hay fever, colds, etc., D. O. Wilhelm ... 12,342
Seeds, all kinds of field, garden, grain, grass, tree, shrub, and flower, O. Landreth ... 12,337
Stove polish, R. H. Wetherell ... 12,341
Stoves and ranges for cooking and heating purposes, J. Born ... 12,332

DESIGNS.

Carpet, D. G. Melville ... 16,137
Fireplace front, E. A. Jackson ... 16,135, 16,136
Organ case, L. K. Fuller ... 16,134

A printed copy of the specification and drawing of any patent in the foregoing list, also of any patent issued since 1866, will be furnished from this office for 25 cents. In ordering please state the number and date of the patent desired, and remit to Munn & Co., 361 Broadway, New York. We also furnish copies of patents granted prior to 1866; but at increased cost, as the specifications, not being printed, must be copied by hand.

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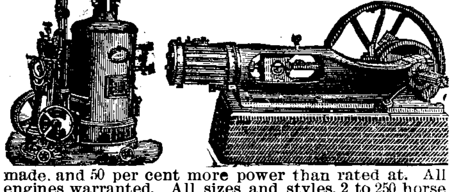

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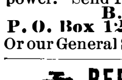

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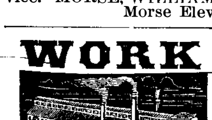

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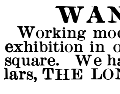

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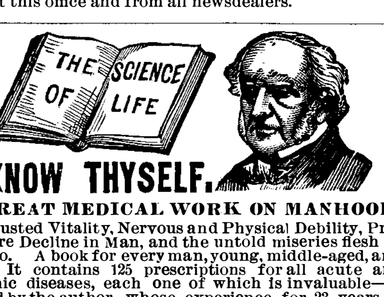

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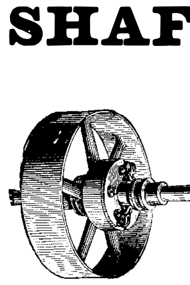

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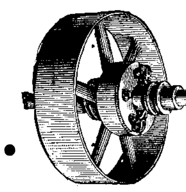

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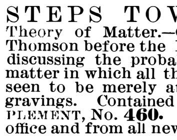

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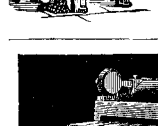

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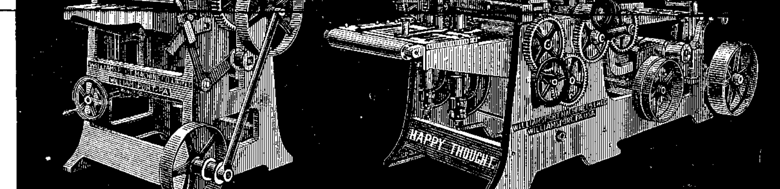

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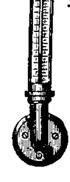

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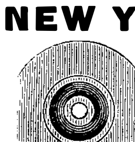

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