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TORPEDO DEFENCE-INVENTION WANTED.

An invention that will protect ships of war from attacks date, and can be retained. of torpedoes is wanted; and this want ought to stimulate the inventive skill of mechanics and scientific men. Torpe-firmed by the Commissioner, has been made in the case of does in some form have played an important part in the W. W. Bierce, for improvement in strip or ribbon tickets, wars of latter years, but these torpedoes were not the infer- The object is to use these tickets on street railways. The days they were receptacles filled with explosive material, tickets made to be redeemable. The decision was that this and were either anchored in the pathway of vessels or floated form of tickets was old, and that the system of redeeming to the object that was desired to be destroyed. They were tickets old also. The refunding of money to the possessor fired by concussion, clockwork, or time fuse. The location of certain tickets is not essentially an improved device or of such torpedoes could most generally be discovered, if article, but rather a method of transacting business, and this proper attention was directed toward their places of con- method is not patentable, as it neither relates to a machine, cealment.

Torpedoes of that class were playthings compared with the inventions of Lay, Ericsson, Whitehead, and Thorneytheir pathway cannot be discovered by the assailed party. From them the greatest danger is to be apprehended.

Let us take, for example, the Lay torpedo, notices which performance have appeared in our columns, and this claim therein. The Commissioners concurred in the there seems to be but little protection from its attack. It is views of the examiners that a notch had been used in others launched silently, and with accuracy it speeds toward its in- than these with a jaggedly cut mouth and for precisely the tended victim. The operator being on shore, or at a dis-same purpose, to facilitate opening, and it merely resulted tance, is able to navigate it through crooked and intricate in the double use of an old device. channels, and direct it at his will to unerringly strike its formidable antagonist and sends him a wreck beneath the waves. But if this antagoniat be anchored, precautions of yet so closely resembles another as to mislead the public, is safety may be employed. A net-work of iron may be sup-denied to Coggin, Kidder & Co., as is also the addition of an ported on booms, or pendent below the vessel's keel, arbitrary symbol of a Maltese cross to the trade mark, which through which the torpedo cannot burst. A cordon of is declared not to amount to sufficient difference to warrant ropes may surround the vessel, supported on boats in which registration. In the judgment of the Commissioner, the are watchful crews to give an alarm. Other devices may be leading word was calculated to mislead the public, yet when employed; but they more or less interfere with the sailing the two words were seen side by side, the difference could qualities of the vessel, and would seriously retard its man-readily be perceived. agement should an antagonist present himself, and an engagement ensue.

mine its position. But let this vessel be attacked by the the trade mark was sufficient, and that no protection is af-Lay torpedo, or others of like character, and such defense is forded to the use of scrolls, or figures that are not an essenfutile. The net-work of wire will keep it at a distance, but tial part of the mark. To recognize them would tend to the objections to its use, except at anchorage, are as given. mislead the public as to the scope and nature of the regis-At a recent attack of four torpedoes upon a Turkish vessel tration. in the Danube, the commander saved his vessel by coolness nists.

What the protection for the swift and unseen movements well the action and approach of the torpedo, submerged as to the employee who suggested it. it is. Remember they are swift and unseen in their movements, impregnable to attack, and most destructive in their effects. That a defence can be wrought out that will be all that can be desired we have no doubt, and he may consider himself fortunate who does it.

NOTES OF PATENT OFFICE DECISIONS.

Upon the refusal of the Commissioner of Patents to grant a reissue in the case of Mayall & Williams on the ground single too intense-light in several smaller ones, say fifty, each that an interfering application had been filed subsequent to producing a light of an intensity measured by one to fifteen the date of their patent, and that the grant of this reissuedepended on a question of priority, to be determined by him, in these smaller lights. as between the interfering application for patent and the patent of Mayall, the Supreme Court of the District of and of no effect, and decided that the appellants were entitled to a reissue and that the same be reissued to them.

Upon the rendering of this decree the rules of the Patent Office have been amended to accord with this decision. All that it is bound to supersede other methods. interferences now pending between reissue applications of prior patents and later patents, or with applications for re-that, if a continuous light is obtained by one single current issues of later patents, or with subsequent original applications, will be dissolved; but on motion, the record in the in- isolating substance between the carbons is, at its upper end beterference proceeding may be amended by the substitution tween the luminous points, in a highly heated and nearly fused of the reissued patent in place of the original patent. An ap- condition. In this state it offers a much better conductor to plication has been made by C. W. Siemens for a reissue of the current than it finds between the carbon points attached a patent on furnaces granted in 1869. Some claims were set to regulators where the current has to pass through the reup for devices contained in certain expired foreign patents, sistent atmosphere. Experience showed that with a certain the inventions of the applicant. The Commissioner has detension of the current excited by the machine, the limit to cided that the applicant had no right to a reissue, and could which this current can be subdivided through the melted not claim matter shown in a prior foreign patent that has conductors is sufficient to generate several luminous points expired. One of the reasons given is that the subject matter of relatively high luminosity. But no more than eight eleccould not be protected in the courts, and on that account the tric candles could, in this way, be fed by a single machine of patent should be refused, that in such cases no distinction middling size. should be made between the original application and reissues. No color should be given to an individual claim, by spark, produced by a current of high intensity, upon firegranting a patent purporting to secure a right, when the proof bodies. He passed the current of a dynamo-electric Office has no such right to confer.

years from the date of foreign patents previously obtained. outer wire to act upon small bars of kaolin, which were Under the act of 1861, all patents granted were to remain in force for seventeen years from the date of issue. In the act of 1870, patents granted to foreign inventors were limited to seventeen years from the date of such foreign patent.

invention in a reissue does not exist.

That portion of the invention patented in England in 1861: A small consumption of kaolin was observed, which, during

has not yet expired by limitation of seventeen years from its

An appeal from the decision of the Examiners, and conmanufacture, or composition of matter.

A claim had been made by James Arkell for a paper bag with a jaggedly cut mouth and also the method of making it. croft. The approach of these messengers is submerged and The claim for the article was rejected, which was acquiesced in and the claim stricken out. A few days before issuing the patent for the process, the applicant filed a claim for the article. He should have applied for a reissue, and included

TRADE MARKS.

The registration of a trade mark that is not identical with

In the application for a trade mark by W. S. Kimball, filed in eight different arrangements of figures in connection Protruding spars may keep off a torpedo boat, similar to with the trade mark, to show the modes in which it had the Thorneycroft launch, and the electric light would deter-been applied and used, the decision was that the facsimile of

The question of priority in the use of a trade mark in the and quick mancevering. But the type of some war vessels case of Swift vs. Peters has been decided to have nothing to is such, especially those heavily armored, that they cannot do with the question as to who first conceived the idea, or to be thus handled, and would therefore at times present op- describe and propose its use. In this respect a trade mark portunities for the approach of their fleet-moving antago differs from patentable matter. The trade mark is the property of the party who puts it into actual practice. If an employee suggests the use of a mark and places it upon of submerged torpedoes may be, the future can only decide. the packages of his employers, by whom it is adopted, it is It is left for inventors to work out. As a hint, we say study considered the property of the employer, and its claim denied

RECENT GREAT IMPROVEMENTS IN ELECTRIC ILLUMINATION.

Jablochkoff, of St. Petersburg, Russia, who invented the electric candle which we described on page 339 of our last volume (June 2, 1877), has since made most important important improvements in the method of electric illumination, which consist, first, in sub-dividing a current, producing a gas burners; and, secondly, in abolishing the use of carbons

It may be well to observe here that the Russians are very deserving in the pursuit of science, especially the electrical Columbia declared this decision of the Commissioner void branch: it was Jacobi, in St. Petersburgh, who, forty years ago, made the first electrotypes and navigated the Neva with a boat propelled by an electro-magnetic motor; and now it is Jablochkoff who makes electric illumination such a success

Since his first experiments with electric candles he found, in several of his candles, it is chiefly due to the fact that the

Jablochkoff, therefore, tried the action of the electric machine through the inner wire of a Rühmkorff induction Under the act of 1836, patents were limited to fourteen coil, and caused the spark of the induced current in the placed between the terminals of the outer coil. This current was strong enough to glow and melt small kaolin bars, but was not capable of making them highly luminous.

The next experiment was to pass the current through bet-The object of the reissue section is to provide a means of ter conductors which would, as it were, attract the current, correcting individual patents; and if the period for which the and which he fixed to the edge of the kaolin bar, which, grant was originally made has expired, the right to claim the being a conductor of great resistance, by passing a current of high intensity, became white hot, and emitted a fine light.

in place of disappearing with the spark, is a permanent detailed. source of light, which gives as quiet and steady a light as induction coil.

sizes were used. The intensity of the light was various in bar contained the highest percentage of copper. proportion to the size of the coils. The intensity of the korff coils, the contact breakers and condensers of these coils of pores and other flaws. become of course unnecessary. In this case the whole system of subdivision of the current can be reduced to one principal conducting wire, of which the function is performed by the primary wire of a Rühmkorff coil, around which then as many secondary coils are wound as secondary currents are required. Every luminous point is then perfectly independent of every other luminous point, and can be ignited or extinguished without interfering with the others. The division of a current in a building to be illuminated with electricity becomes then similar to gas illumination. In a manufactory the illumination may be so arranged that the large rooms are illuminated by electric candles, the office, the entrances, the halls, etc., by the electric bands. The apparatus for small halls is of a surprising simplicity, and consists of a small porcelain rod, which is kept in incandescent condition with very little wear.

To recapitulate the results obtained by Jablochkoff we may say that they consist: 1. In a perfect subdivision of the electric light. 2. Perfect steadiness of the thus subdivided light. 3. The possibility to give any luminous point every desired degree of intensity. 4. Dispensing entirely with the carbons in lamps of smaller and medium luminosity.

NEW INVESTIGATIONS ON COPPER ALLOYS.

Professor R. H. Thurston has recently conducted, at the Mechanical Laboratory of the Stevens Institute of Technology, an extended series of investigations into the properties of the copper-tin and copper-zinc alloys. From the records of the researches we have, through the courtesy of Professor Thurston, gathered the more important results obtained, and they are herewith presented.

COPPER-ZINC ALLOYS.

The experiments upon copper-zinc were begun by casting one series of 21 bars, each 28 inches in length and 1 inch square in section, and then a second series of 20 bars of similar size. In the first series the proportions of zinc and copper differed regularly for each bar, to the extent of 5 per cent, bar 1 containing 5 per cent of zinc, bar 2, 10 per cent, and so on up to 100 per cent of pure zinc. In the second series the first bar contained 2½ per cent, and the last $97\frac{1}{2}$ per cent of zinc, the relative differences being the same.

By examination of the color of these various alloys it appears that they may be divided into three clearly marked classes, viz: the yellow alloys, which excludes all those containing less than 55 per cent of zinc; the silver white and brilliant alloys containing between 60 and 70 per cent of zinc, and the bluish-gray alloys, containing more than 75 per cent of zinc. On applying tests for transverse strength, it appears that the first class above noted may be divided into two divisions, one showing considerably more strength than the other; in the first are included the bars containing from 17.99 to 33.50 zinc (and probably all the alloys from pure copper to the latter limit). These show a modulus of rupture (by which is meant a value proportional to the transverse strength of a bar, and which is theoretically equivalent to $1\frac{1}{2}$ times the load which would break a bar of 1 unit in length, breadth and depth, supported at both ends and loaded in the middle) from 21,000 to 28,000, and are characterized by great ductility and an earthy fracture. The second division includes alloys from 38.65 zinc to 52.28 zinc inclusive, which show greater strength than the preceding. The point of maximum strength is determined to be between 38 65 zinc and 44 94 zinc. The second class of alloys show tance, because the great speed at which they revolve causes trackmen, which the company refuse. Prospects are that great weakness and lack of ductility. The minimum the least defect in the balancing to vibrate the wheel when in the Ohio and Mississippi road may be included among the strength was found in alloy of 65 per cent zinc, the modulus motion. This vibration causes undue wear to the wheel as strike. The trouble on the Pittsburgh and Fort Wayne road of rupture being but 10 of the maximum. Alloys of the well as tending to throw the wheel out of true. Of is assuming a serious aspect. Meetings are being held by third class showed much greater strength than those of the late cast iron spindles are being introduced for emery wheels the employees of the Union Pacific, and an outbreak is second, but not equal to that of those of the first.

zinc average 30,000 lbs. to the square inch and are classed the existence of air holes is a great disturbing element, and States held a meeting at Washington and have recommended as useful metals. 60, 65, and 70 per cent zinc alloys are in the next place the position in the mould, in which the iron | moderation and to avoid strikes, and resolved that moral agivery weak, the highest average being that of the 60 per cent is cast, is found to be of practical importance, because the tation is the strength and power by which labor can acquire alloy, which is 3727 lbs. to the square inch. The remain- iron at the bottom is found to be more dense and heavier than tangible reformation and that mob violence and riot leaft der of the 21, or third class, average from 18,065 to 5,400 that at the top. To remedy these defects, the castings were only to anarchy and final destruction of human liberty. lbs. per square inch; pure zinc being the weakest. The given very large gates or runners, the cope of the mould bemaximum strength is possessed by an alloy containing some- ing made extra deep for that purpose. This, however, proved

of an inch). The light, which in this way can be produced In torsional tests the average results agreed with the forego- and bottom of the metal being very plainly perceptible. This by the secondary wire of the induction coil, is seen in the ing. In compression the 55 per cent alloy showed a max- led to the adoption of the plan of casting vertically as well form of a beautiful luminous band, which can be made to imum of 121,000 lbs. to the square inch, pure zinc yielding as casting them in longer pieces, using only the lower end attain a much greater length than the induction spark obtained at 22,000 lbs. Tests conducted on the second series of alloys for the spindle. The result is, not only is the formation of from the Rühmkorff coil alone. But this luminous band, closely confirm the results already stated and need not be air holes prevented, but the metal is at any part of its length

any other known source. In regard to the intensity of the be compounded, chemical analysis of the metal after casting the spindle to run as true as possible in the lathe, for the light, this depends on the amount of wire and the size of the often reveals a notably different composition. In analyzing metal is always more dense at and towards the outside of the the copper-zinc alloys above noted it was found that the casting; and if more is turned off one side than the other the As it is possible to insert a great number of induc-only general differences, between the components of the balance will be, to a like degree, affected. After the spindle tion coils in the current of a Gramme machine, and as original mixtures and those determined by analysis, was is turned, its balance should be tested by placing it upon two further the induced current developed by every coil can be that in almost every case a smaller percentage of zinc ap- knife-edged parallel pieces set horizontally true, and setting subdivided into different sections, it is possible to attain a peared and a larger percentage of copper. The real decrease it in motion. Note the side that is downwards when the perfect subdivision of the electric light. Nothing is easier of zinc is believed to be due to volatilization of the metal in spindle comes to rest. If upon turning it upside down and than to obtain in this way say 50 luminous points, of any melting and casting. The average loss was from 1 to 2 per end for end, and making several tests, the same side is cent in a bar. In several bars a considerable amount of always at the bottom when the spindle comes to rest, that In the experiments referred to, induction coils of various liquation took place, and in general the upper end of the side is the heaviest, and should be adjusted by boring a small

The variation of specific gravity with change of composivarious luminous points was graduated in such a way that tion follows a very definite law, decreasing very regularly the weakest gave a light of 1 to 2 Argand burners, while the with the increase in percentage of zinc. None of the zincstrongest was made equal to 15 burners. When machines copper alloys have a greater density than that of pure zinc, producing alternate currents are used to excite the Rühm- tne only apparent exceptions being caused by the presence

COPPER-TIN ALLOYS,

In the experiments on the copper-tin alloys, bars of the same size as already noted were first cast. Two series of alloys were prepared, the first numbering 30 compositions, beginning with pure copper and then varying in percentages of tin from 1.9 up to 99.44 and ending in pure tin. The sec- on the spindle. Then the wheel and spindle together should ond series consisted of 20 bars ranging from $97\frac{1}{2}$ per cent copper and $2\frac{1}{2}$ per cent tin to $97\frac{1}{2}$ per cent tin and $2\frac{1}{2}$ per cent copper, with a regular difference of 5 per cent.

Alloys containing respectively 1.9, 3.73, 7.20, 10, 13.43, 20, and 23.68 per cent tin were found to have considerable strength; and all the rest of series 1 are stated to be practically useless where strength is a requirement. The dividing line between the strong and brittle alloys is precisely that at which the color changes from golden yellow to silver white, viz: at a composition containing between 24 and 30 per cent of tin. Alloys containing more than 24 per cent of tin are comparatively valueless. Tests by tension give results according with the foregoing. Generally it appears that the tensile and compressive strengths of the alloys are in no way related to each other; that the torsional strength is closely proportional to the tensile strength, and that the transverse strength may depend in some degree upon the compressive strength; but it is much more nearly related to the tensile strength as is shown by the general correspondence of the curve of the transverse with that of the tensile strength. The maximum crushing strength was given by the 30 per cent tin alloy and the minimum by pure tin.

The results of the tests for transverse strength on the second series do not seem to corroborate the theory given by some writers that peculiar properties are possessed by the alloys which are compounded of simple multiples of their atomic weights or chemical equivalents, and that these properties are lost as the composition varies more or less from this definite constitution. It does appear that a certain percertain percentage a minimum; but neither of these compositions are represented by simple multiples of the atomic weights. Besides, there appears to be a perfectly regular law of decrease from the maximum to the minimum strength, which does not seem to have any relation to the atomic proportions but only to the percentage composition. On analyzing the copper-tin alloys there appears to be a greater loss of tin than of copper in the bars which contain the greater percentage of copper, and a greater loss of copper, than of tin in the bars which contain the largest percentage of tin; and that the bars which contain about equal amounts of the two metals show a great tendency to liquaby original mixture there is a greater loss of tin than of copper, with but three exceptions. In the alloys containing more than 70 per cent of tin, there is a greater loss of copper alloys containing less than 25 per cent of tin does not great

BALANCING EMERY WHEELS.

above 10 inches in diameter, and they require very careful feared. In tensile strength alloys containing up to 50 per cent manufacture to properly balance them. In the first place what less than 44 per cent of zinc, and the minimum tenacity successful for the prevention of air holes, but not altogether | cement for broken furniture.

the experiment, amounted to one millimeter (one twenty-fifth is 1,774 lbs. per square inch in an alloy of 70 per cent zinc. so for equalizing the density, the difference between the top of practically equal density diametrically. This, however, It is well known that, no matter how accurately alloys may is of minor importance. The next consideration is to center hole, either in the end or upon the circumference.

The part of the spindle upon which the driving pulley fits should be made a neat driving fit to the pulley, so as to avoid the use of a key, which would destroy the balance. The centers of the spindle should be center drilled and countersunk, so that the spindle may keep true during the whole turning operation, the end faces being carefully turned true for the same purpose. The pulley should be cast with its diameter standing vertical, the hole should be bored out true and smooth, the wheel should be turned down to very nearly the finished size upon a temporary mandrel, and then placed in position upon the spindle and finished in the lathe while upbe tried upon the knife-edged parallel strips in the same manner as the spindle was tested.

The washer should be cast flat and carefully turned true, the inside face being recessed to within about one quarter of inch of the circumference, which is done to ensure that it shall grip the wheel at and near its edge, thus holding it true as well supporting it as far out from the center as possible. The nut should be made very true, the thickness from the bore to each flat side being made quite equal. The best form of nut is a cylindrical one with two flat sides, which is the easiest form to make and ensure truth. The washer and nut should be placed upon the spindle, and the balancing of the whole again tested upon the parallel strips. The emery wheel may then be fastened upon the spindle, the bore being made a neat sliding fit, and then the strips should again be brought into requisition to test the balance while the whole are together. The wheel is very liable to require balancing, because it is very difficult to make a wheel of equal density throughout. If the wheel is out of balance it must be corrected in the wheel itself, and not by drilling holes in the spindle or pulley, because in that case the wheel, though balanced when new, will lose its balance as it wears smaller. It is necessary, therefore, to provide a center piece and to throw the wheel out of true in the lathe, taking care that the densest side is the prominent one; then by taking a cut down the radial face of the wheel, leaving it just true, the balance may be corrected. The center, however, should be thrown out but very little, and the balance tested. The process should be repeated till an exact adjustment is attained. By adjusting the balance in this manner, the spindle will, centage composition gives a maximum strength, and another when once made, neverrequirealtering; and all that is necessary is to balance, in the manner described, each new wheel when it is put on, and the result will be sufficiently perfect for all practical use.

THE GREAT RAILROAD STRIKES.

The strike on the Baltimore and Ohio Railroad which commenced about the 16th inst. has assumed such character and proportions that the State authorities of Virginia were unable to cope with it, and the interference of United States authority has been called to quell the disturbance. If the organization of the train men is sufficiently perfect and extensive it will extend to many other roads. A strike and tion. In the alloys containing less than 35 per cent of tin much trouble will result. It has already commenced on the Pennsylvania Central Road, and apprehensions of similar trouble are feared in Michigan. The strike on the Chesapeake and Ohio canal still continues. At Cincinnati developthan of tin, with only one exception. In all of the alloys of ments indicate a strike on the several roads centering at that these two classes the extreme variation of a single mixture place. On the Central Ohio division, all freight trains have is 3 6 per cent, and generally it is less than 1 per cent. It been detained. The employees of the Great Western Railfurther appears that the actual specific gravities of all the road of Canada are protesting against a reduction of wages, but have made no other move.

The employees of the western division of the Eric road have struck, demanding the pay received before the reduction and a free lease of property to squatters on the road-The proper balancing of emery wheels is of great impor- lands, and free passes to firemen, brakemen, switchmen, and

The central council of the Labor League of the United

SHELLAC dissolved in alcohol will be found to be a good