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EXTENSION OF OUR SOUTH AMERICAN TRADE. Judging from the geographical standpoint, it must be admitted that the trade of the South American states belongs to the United States and should be controlled by them. As a matter of fact, however, the export and import trade is chiefly in the hands of German, English, and French houses, which supply most of the manufactured products called for in these countries. It must not be supposed that the relative scarcity of American trade is due to any superiority in the goods manufactured in European countries. The paucity of our trade is explained by the fact that we have comparatively very little commercial representation in these states. It is the practice of other countries to maintain exhibition centers, where their goods are always on view, and these are superintended by expert salesmen who are thoroughly in touch with the wants of the community and keep their wholesale houses continually informed of its needs.

We have already drawn attention to the efforts of the National Association of Manufacturers of the United States to establish at Caracas, Venezuela, a depot for the exhibition of sample American goods, and we are glad to learn that the enterprise is now being established on a firm basis.

The government of Venezuela has given material equivocation designed for the deception of inventors. assistance by rescinding the duty on goods which are brought for purely exhibition purposes, though, should the goods be subsequently sold, the duty would, of been assigned by the Commissioner to conduct this incourse, be collected. One of the leading steamship lines has also agreed to reduce the rates one-half on was the custom of the firm in question to render all goods that may be shipped for exhibition. The favorable reports and send misleading letters to incharges for exhibition space will be such as are nec-ventors of clearly unpatentable inventions. When essary to cover the current expenses, exhibitors being the inventor responded and the application was lodged charged from two to five dollars per square foot per year. Great care will be exercised in the selection of salesmen, and the management will favor the employment of men who are thoroughly conversant with the country, its people and its needs. We very patent, which might be overcome if an appeal was heartily commend this enterprise to the attention of taken to the Board of Examiners in Chief, and further American manufacturers. It is certainly the most fees were asked for. If the amount was forthcoming, practical way to attack the problem of opening the in numerous cases very little or no effort was made by doorway for our surplus product into this hitherto much neglected field.

THE PROPOSED RAPID TRANSIT TUNNEL, NEW YORK CITY.

The commission of three appointed by the Appellate Division of the Supreme Court to report upon the tunnel railroad proposed by the Rapid Transit Rail- the invention and having a sketch of himself written road Commission of New York City is now engaged in and published. taking testimony from the commissioners, the chief engineer, and the property holders along the route of the road. The data furnished by the engineer places the prospects for building the road in a better light than they have presented at any time since the original scheme was first mooted. The present amended plans were illustrated and described in the issue of the SCIENTIFIC AMERICAN SUPPLEMENT for November 21, 1896, at the time when they were first drawn up. In the interval more extensive surveys have been made, and the latest estimates show that the probable cost of the road will be even less than that originally estimated for the amended scheme.

According to the present plan, a trifle over twenty miles of road will be built. This will reach from the Post Office to the Kingsbridge Station on the west side, and to Bronx Park and the Boston Road on the east side. Although this is about two miles longer than the route first proposed, known as the Broadway route, it involves two miles less of four-track tunnel. The estimated cost of the route which was vetoed by the Appellate justices was about \$50,000,000, whereas the estimated cost of the present proposed route beneath Elm Street will not be over \$32,600,000. This total, however, will be considerably reduced if the commissioners persist in their decision not to put up any pipe galleries at their own expense, and to replace the proposed en-

the high speed which would be realized in the new tunnel would very quickly reconcile the New York citizen to the fancied inconveniences of this mode of travel.

DECEPTIVE METHODS OF PATENT ATTORNEYS.

The general discredit which the practice of certain patent attorneys has cast upon the Patent Office and the profession, by reason of their peculiar crooked methods and deceptive advertisements, is greatly to be deplored, since it is likely to create in the minds of many well meaning inventors a lack of confidence in all attorneys, however honorable a reputation they have borne in the past. The activity, however, of the present Commissioner of Patents, the Hon. Benjamin Butterworth, in taking measures to raise the standard and morale of the office, and by examining into the methods of John Wedderburn & Company, charged with pursuing fraudulent methods in patent practice, is greatly to be commended and will doubtless receive the approval of all inventors.

We believe there has never been before the Patent Office a case of such magnitude as that now pending before the Commissioner, in which is disclosed by the evidence, a surprising system of misrepresentation and

According to the evidence as brought out at the examination by Assistant Commissioner Greeley, who has vestigation, it appears in a large percentage of cases it in the Patent Office, he was usually rewarded with a silver medal. Upon the absolute refusal by the Patent Office of a patent the inventor was advised that serious objections were raised against the granting of a argument, and usually the decision of the examiner below was affirmed, of which the inventor was seldom notified, but on the contrary was apprised of the probable remarkable value of the invention, estimated at various sums from \$5,000 to \$20,000, and was urged to secure foreign patents. He was further requested to remit another sum for the purpose of advertising

Thus by an extensive system of flattery and misleading correspondence, combined with medals or prizes, the inventor was led into the belief that his unpatentable invention was patentable and likely to bring to him a fortune.

Whatever may be the outcome of the proceedings instituted by the Commissioner of Patents, one excellent result is already manifest in the fact that fraudulent and crooked methods of securing patents have been in a measure checked, and the aspersions cast upon reputable attorneys nullified. There should be brought about soon a wholesome restoration of confidence between inventors, attorneys and the administration of the Patent Office, which should be of lasting benefit to all.

PROSPERITY.

The prolonged period of business depression, which may be said in a general way to have lasted since 1892, appears at last to have come to an end, and from almost every quarter and in nearly all lines of business we hear most encouraging reports. We think there will be general unanimity in finding the principal factors of the depression of the past four years in three main causes-the difficulty in repealing the silver purchase act, and the consequent doubts as to the stability of the currency, and the two successive tariff acts, with ameled-brick tunnel lining with painted cement con- the disturbance they have caused to trade and manucrete-a change which will probably be made. This facture. Whatever may be the merits or demerits of would effect a saving of about two and a half million the tariff just enacted, it is a great thing for business dollars, and would reduce the cost of the completed that the subject is now out of the way, probably for nnel to something under \$30,000,000. The preliminary three or four years, at the least, and it is extremely

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rings which have been made through Center Street, in Street, Fourth Avenue and the district beyond, licate that the work of excavation will be easier than s at first anticipated.

fortuitous that, just as this most vexatious matter ceases to cast its shadow over the business world, we are come upon a period of good crops and advancing prices for the farmer. The grain crops of the rest of

the world are below their usual average, while our The fact that this great and much needed pubwork can be built for such a reasonable sum wheat crop is considerably above the average, and, with a surplus of corn from last year, we shall have early one-half less than the probable cost of the oadway scheme) will remove a considerable part of large supplies to market at figures which have been e opposition which the scheme originally aroused. steadily advancing for the past three months, and do ext to this the greatest difficulty to be overcome is not yet appear to have reached their limit. So, too. it prejudice which will naturally exist against any is predicted that this year's cotton crop will be the derground system of transit. Regarding this, it must largest one ever raised. The trunk line railways are all admitted that the question is one of a choice between i making preparations to handle a very heavy business, o difficulties. The public must either be content to which will test the capabilities of their entire rolling built to the overcrowding and general inconvenience | stock.

the present overloaded facilities or it must take the The improvement in trade and manufacture, stimunnel with its comparative darkness and other imlated and supported as it necessarily is by the excellent inary discomforts. Judging from the success of crops, which must always afford the backbone of a derground transit as carried out on modern lines, it healthy prosperity, is also largely due to the increasing almost certain that the enlarged accommodation and confidence of business men and capitalists that nothing long working to debase the currency of the country. The best evidence of the hopelessness of their task is to be found in the steadily declining price of silver, and, although the silver agitation may continue for some time yet, the possibility of its again becoming a vital issue grows more distant with each improving feature of the business situation. Confidence is of slow growth, but it is evident that it is now the dominant feature in business circles generally.

A SUCCESSFUL SOLUTION OF THE LOCOMOTIVE COUNTERBALANCE PROBLEM.

The Purdue University locomotive testing plant has recently concluded a series of tests which will rank high in interest and value among the many which have been carried out since it was first put in operation. As most of our readers are aware, the apparatus has been designed for the purpose of subjecting full sized locomotives to test under conditions which shall be as far as possible identical to those which obtain in actual service on the road, and the data which is so secured has the double value of a trial which is at once practical and scientific-all the possibilities of error being eliminated with the care which distinguishes laboratory work.

The tests to which we refer were carried out upon a locomotive which was designed for the purpose of overcoming the old-time and apparently insuperable difficulties attendant upon counterbalancing. What these difficulties are is so well known as scarcely to call for repetition here; but the effects of faulty counterbalancing are not so generally appreciated. How destructive these effects may be, how costly to the railroad companies in repairs both to rolling stock and to expediency and relative cost. The present practice of preceding sections who shall show that the individuals track, may be judged from the fact that a poorly balanced freight engine running at high speed over a stretch of track has been known to bend the steel rails upon the track and bridges. Not only so, but it shortinto a series of hollows, and in some cases break them altogether.

The counterbalance difficulty arises from the impossibility of balancing the moving parts (crank pins, connecting rods, pistons, etc.) which are attached to the the 400 pounds carried in the test, and running at high registration under this rule. driving wheels, so that the center of gravity of the wheels and the attached parts shall coincide with the axis of the wheels. The revolving parts (crank pins, part of connecting rods, etc.) may be balanced to a nicety by placing weight on the opposite side of the wheel; but the reciprocating parts (part of connecting question which may well be commended to the thoughtrod, the crossheads, piston rods and pistons) cannot be so balanced for the entire revolution of the wheel. For if, after the revolving parts have been provided for, counterbalance weights be added whose momentum will be equal to the momentum of the reciprocating parts when the latter are at the half stroke and traveling at their greatest speed, it is evident that when the crank is on the dead center and the reciprocating parts are at rest the whole momentum of this counterbalance will be "in excess," as it is called. This excess will increase the pressure of the wheels on the rails on the downward half of the revolution and reduce it on the upper half. Theoretically we should expect that a speed would be reached where the upward momentum would exceed the tension of the springs, causing the wheels to jump clear of the track at each revolution. It was suspected that this variation of pressure of driving wheels on the rails occurred in practice, and the various tests at Purdue University have shown that amendment to the Rules of Practice, promulgated such alternate "hammering" and lifting actually takes place.

If all the reciprocating parts are balanced, there will be destructive vertical hammering; if none is balanced, there will be longitudinal disturbance, producing an uncomfortable tremor throughout the train and badly racking the locomotive. To meet the difficulty, or rather to moderate it, locomotive builders have taken a middle course, and, while balancing all the revolving 1897, is amended to read as follows: parts, they have balanced only a portion-usually 70 per cent-of the reciprocating parts. This results in an may prosecute his own case; but he is advised, unless of the proposition to bring a stern wheel river boat, excess balance of from 400 pounds in the average engine to as high as 800 pounds in some recent heavy com- torney, as the value of patents depends largely upon pounds. This, in the latter case, is equivalent to the the skillful preparation of the specification and claims. vertical effect of fastening nearly half a ton of metal | The office cannot aid in the selection of an attorney. eccentrically within a wheel which is revolving at the rate of 300 or 400 revolutions per minute. It is little which will be entered the names of all persons entitled and further encumbered by a heavy stern wheel, is wonder that rails are bent or broken and that the locomotive repair bill is often so heavy. In the locomotive which has recently been tested on The names of the following persons will, upon their down a treacherous coast is to be undertaken. the Purdue plant the difficulty is overcome by the use of four cylinders. These are arranged so that each pair of engines on either side has its cranks set 180 degrees the present Rules of Practice, June 18, 1897, was enapart, and the reciprocating parts are made to exactly counterbalance each other. A full description, with applications for patent before this office, or had been illustrations, of this engine was published in the SCIEN-TIFIC AMERICAN and the SUPPLEMENT respectively for November 14 and November 21, 1896. Without going member of a firm so engaged and not disbarred, prointo details, it is sufficient to say that the reciprocating | vided that such person shall, if required, furnish inparts of the low pressure engines were designed so as to formation as to one or more applications for patent be of the same weight as those of the high pressure en- so prosecuted by him. gines, and by placing the cranks at 180 degrees, as stated, the counterbalancing dilemma was entirely re- any court of record in the United States or any of the moved. In the current issue of the SUPPLEMENT will States or Territories thereof, and shall furnish a certi-platinum theoretically sinks to 0 at -258° Centigrade.

will be practically effected by those who have been so Goss, of Purdue University. It consisted in running a set of wires between the locomotive drivers and the supporting wheels on which they turned, the theory being that the wires would be flattened in proportion to the pressure to which they were subjected during a revolution of the drive wheels. If the pressure was even, the wire would be even in thickness; if it varied, the thickness of the wire would vary proportionately.

In the tests which had previously been made on the Schenectady experimental engine, which carries an excess balance of 400 pounds, the wire, after passing under the drivers, showed great variations in its thickness, which increased where the counterbalance in the wheel approached the upper quarter of its revolution until its full diameter was reached, "a condition," says Prof. Goss, "which continues through several considerable portion of its revolution."

On the other hand, the wires from the balanced locomotive were "nearly of the same thickness throughout."

The report concludes by stating that the data of the test justify the conclusion that the drive wheels of this locomotive "are at all times in perfect balance, that they neither increase nor diminish the pressure with which they act upon the rails as they revolve."

This very creditable result goes to prove that many of the so-called inherent drawbacks of some of the most familiar mechanical appliances are not inherent at all, and may be made to yield to an intelligent treatment of balancing involves the use of four cylinders and a multiplication of parts, the question becomes one of turning out locomotives carrying an excess balance is admitted to result in a more or less destructive action ens the life of the locomotive itself. The Purdue tests indicate that the wear and tear of the track from this cause must always be considerable, and that under speed, it must be enormous.

locomotives due to excess balance in the present type of locomotive exceed the extra cost of a four cylindered locomotive of the same weight and power? This is a ful consideration of the roadmaster and the master mechanic.

OFFICIAL REGISTRATION OF PATENT ATTORNEYS.

We have commented before on the need of more stringent requirements by the Patent Office of persons who desire to practice there in the rôle of attorneys than has heretofore existed, in consequence of the fraudulent practices that have been permitted with regard to applications for patents and their subsequent prosecution. The need of reform in the patent bar, if there is such a thing, has been evident for a long time.

We therefore are glad to note that a step in securing such reform, and which should soon exert an elevating influence on those engaged in soliciting patents, as well as give renewed assurance to the public that it will be honorably and honestly treated, is the new order and August 6, 1897, by Hon. Benjamin Butterworth, Commissioner of Patents, which requires a register of attorneys to be kept at the Patent Office. The amendment is so important that we herewith give it in full :

> "DEPARTMENT OF THE INTERIOR. "UNITED STATES PATENT OFFICE,

> > "WASHINGTON, D. C., August 6, 1897.

"Rule 17 of the Rules of Practice, approved June 18,

"17. An applicant or an assignee of the entire interest familiar with such matters, to employ a competent at-

torial court, duly authenticated under the seal of the court, that he is an attorney in good standing.

"(c) Any person who has been regularly recognized as an attorney or agent to represent claimants before the Department of the Interior or any bureau thereof and is in good standing, provided that such person shall furnish a statement of the date of his admission to practice as such attorney or agent, and shall further show, if required by the Commissioner, that he is possessed of the necessary qualifications to render applicants for patents valuable service and is otherwise competent to advise and assist them in the presentation and prosecution of their applications before the Patent Office.

"(d) Any person not an attorney at law who shall file a certificate from a judge of a United States, State, feet of its length and makes plain the fact that the or Territorial court, duly authenticated under the seal wheel must have risen clear of its support during a of the court, that such person is of good moral character and of good repute and possessed of the necessary qualifications to enable him to render applicants for patents valuable service and is otherwise competent to advise and assist them in the presentation and prosecution of their applications before the Patent Office.

"(e) Any firm which at the date of the approval of the present Rules of Practice was engaged in the active prosecution as attorneys or agents of applications for patents before the Patent Office or had been so engaged at any time within five years prior thereto, provided such firm or any member thereof is not disbarred, provided the names of the individuals composing the firm are stated, and provided, also, that such firm shall, of the problem. If it is objected that the new system if required, furnish information as to one or more applications prosecuted before the Patent Office by them.

> "(f) Any firm not entitled to registration under the composing the firm are each and all recognized as patent attorneys or agents or are each and all entitled to be so recognized under the preceding sections of this rule.

"The Commissioner may demand additional proof of qualifications and reserves the right to decline to recoglocomotives having a considerably greater excess than nize any attorney, agent, or other person applying for

"Any person or firm not registered and not entitled To what extent does the cost of repairs to track and to be recognized under this rule as an attorney or agent to represent claimants generally may, upon a showing of circumstances which render it necessary or justifiable, be recognized by the Commissioner to prosecute as attorney or agent a certain specified application or applications; but this limited recognition shall not extend further than the application or applications named.

> "After January 1, 1898, no person not registered in accordance with this rule will be permitted to prosecute applications before the Patent Office.

"BENJAMIN BUTTERWORTH, Commissioner.

"Approved :

"THOMAS RYAN, Acting Secretary of the Interior."

The advantage of this rule to the general public is that before intrusting business to an attorney a person may ascertain from the Commissioner of Patents whether such attorney is on the Patent Office public register. An affirmative answer would convey the inference that the attorney could be depended upon to deal with his client honestly-an assurance which is now lacking, yet which should in the future bring the patent practice up to a higher and better level. All reputable attorneys should at once endeavor to have their names registered and assist in establishing this needed reform. Commissioner Butterworth certainly deserves the thanks of the public and of the patent attorneys in particular for the promulgation so promptly of this excellent amendment.

Ocean Voyage by a Stern Wheel River Steamer. We are informed by Frank S. French, of San Francisco, Cal., that during the past month insurance and seafaring men have been speculating as to theoutcome the H. C. Grady, down the coast from Astoria, Ore., to San Francisco, Cal.

At a glance it will be seen that a flat-bottomed, topheavy and unwieldy craft, built to run on smooth water, with guard scarcely two feet above the water, not a very inviting risk either to underwriters or crew when a voyage of the better part of a thousand miles After many delays a start was made, and for five "(a) Any person who at the date of the approval of days this unseaworthy hulk battled against head winds and high seas, but to the surprise of many actually succeeded in making port under her own steam. The success of the venture is largely due to the skill of so engaged at any time within five years prior thereto the master, Capt. Denny, an old-time sea captain, well known on the Pacific coast.

"A register of attorneys will be kept in this office, on to represent applicants before the Patent Office in the presentation and prosecution of applications for patent. written request, be entered upon this register :

gaged in the active prosecution as attorney or agent of and is not disbarred, or is or was during such period a

"(b) Any attorney at law who is in good standing in be found a digest of the test as carried out by Prof. ficate of the clerk of the United States, State, or Terri-L'Industrie Electrique.

It is doubtful if a stern wheel steamer of this class ever made an ocean voyage before, unassisted by other vessels.

According to experiments recently conducted by Messrs. Holborn and Wien, the electric resistance of