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AMENDING (?) THE PATENT LAWS.

Senator Wadleigh's bill providing for amendments in the United States Patent Laws has been read twice and is now under the consideration of the Senate Committee on Patents. An abstract of the provisions is given elsewhere in this issue, and the bill in its entirety is published in the current number (No. 102) of the SCIENTIFIC AMERICAN SUPPLEMENT, in order that our readers may be enabled to give it thorough and critical examination. Its effect is upon future patentees, and not upon those already in possession of patents.

Our objections to this measure are founded, first, upon certain broad general principles which courts have held to be, and which plainly are, the true basis of our patent system; and second, upon certain specific reasons noted hereafter. The object of our patent laws is to benefit the community. They induce people to invent, so that the inventions produced may, by ultimately becoming public property, add to the knowledge, welfare, and comfort of the nation. The inducement offered is the securing to the inventor of an exclusive privilege in and to his production for seventeen years. While this privilege is a species of indefensible monopoly *per se*, it is nevertheless just and expedient in view of the ends accomplished, and this more especially as the period over which the inventor enjoys it is wholly inconsiderable in view of the advantages which it confers upon the public forever afterward. Now, if this privilege is to be reduced in value, through becoming hampered with unwise restrictions as to how the inventor shall enjoy it, then, the stimulus to invention being lessened, it follows that new and useful ideas will be more rarely produced, and thus the community will be the loser.

Our more specific objections to the bill are that is framed in the interest of a combination of railroad companies. About a hundred and thirty of these corporations some time ago organized an association for mutual protection and combined action in patent matters, and this is now devoting its energies to pushing through Congress the Wadleigh bill. As it is at present, the railway companies are ready enough to use good patented inventions, but about the only good reason which they recognize for paying an inventor royalty or damages is a certificate from their counsel to the effect that they cannot avoid doing so. It is almost needless to add that in the maintenance of protracted suits, etc., wealthy associations already have great advantages over the individual inventor; and if the latter is still further to be hampered, it may soon come to be said that his right is a deception and resides not in him, but virtually in any powerful combination which chooses to pirate it; and this is precisely the state of affairs which the railway companies are seeking to bring about.

The bill being before the Committee on Patents in the Senate, that body is hearing argument concerning it. Inventors should oppose it with all their influence, and we counsel them to go, or send representatives, or even lay protests or letters before the Committee, setting forth the disadvantages. Nor should the active opposition be restricted only to inventors. We have shown how the measure is likely to affect the whole country. It is therefore to the interest of every one who has the progress of the nation, in invention, discovery and science, at heart to lend his aid to prevent its becoming law.

CURIOSITIES OF SUICIDE.

The latest report of the Criminal Administration of France contains a very curious series of statistics relative to the suicides committed in that country in the year 1874. It appears that during that period 5,617 persons killed themselves, and that this total is greater than had ever before been reported. Of these unfortunates 79 per cent were men and 21 per cent women. Of 105 suicides the ages could not be determined, but of the remaining 5,512, 29 were under sixteen years of age, 193 between sixteen and twenty-one, 1,477 between twenty-one and forty, 2,214 between forty and sixty, and 1,590 over the last mentioned age. Leaving out those who committed the fatal act while laboring under mental disorders, in all 1,622, it is interesting to compare the condition of the suicides with the cause which impelled them to make away with themselves. How prolific a source of suicide unhappiness in the marriage relation is, is indicated by the fact that 48 per cent of the total were married people, and that out of 5,136 suicides, regarding which authentic particulars were obtained, 701 killed themselves because of family troubles. It will also be noted that the greater number of suicides were people past the prime of life, indicating that dissatisfaction with a wasted or unsuccessful existence determined their putting an end to it. This is further substantiated by the fact that out of the 5,136, 652 are known to have killed themselves because of reverses in fortune.

Seven hundred and ninety-eight people died to avoid physical suffering, and 489 because of various unclassified troubles. The fact that out of the 815 who were brought to self-destruction by dissipation, 572 owed their misery to drunkenness, is in itself a powerful temperance lecture. It is not easy to understand why spring and summer were the seasons in which most suicides occurred. The percentages are 23 for winter, 19 for autumn, 31 for spring, and 27 for summer. This would seem to negative the statement which has been made that most cases of self-murder occur during gloomy weather, which aids in depressing the spirits, for certainly there are more dark days in winter than in summer and fall. Again, it might be supposed that the privations incident to winter would lend an especial impulse toward the crime. As to the mode of death chosen, more than seven tenths perferred either strangulation (2,472) or drowning (1,514), showing that, while the suicides were willing to throw away their lives, they probably shrank from any mode of so doing which involved mutilation of their bodies.

A COMMON AILMENT.—MALARIAL POISONING.

We give in our this week's SUPPLEMENT—number 102—a full report of a very interesting clinical lecture, lately delivered by Professor Alfred L. Loomis, M.D., before the class of the University Medical College, this city, on Malarial Poisoning. According to Professor Loomis the effects of malarial poison are manifested in a surprising variety of forms and symptoms; so numerous and various, in fact, that they cannot be tabulated. They embrace enlargement of the spleen, neuralgias of different forms, that may or may not be periodical; dyspeptic troubles which cannot be relieved by dyspeptic remedies; headaches that are often treated as cerebral diseases; confusions of mind; staggering gaits; loss of power in portions of the body: impairment of mental faculties; inability to do work of any kind; not sick enough to go to bed, but too ill and habitually too tired to perform anything that requires the least exertion; shortness of breath; rapid, weak, irregular pulse; sleepless nights, etc. The first step toward cure is removal from the malarial locality; then only may the proper medicines be expected to prove beneficial. The infection appears to be far more widely spread than is commonly supposed; and all who have ailments that fall within the category here mentioned, will do well to read the excellent lecture.

NOTES OF PATENT DECISIONS OF THE COURTS.

Eppinger brought suit against Richey *et al.*, to restrain the infringement of his letters patent of June 17, 1873, for bunch or plug tobacco. The defendants answered, admitting the infringement but denying novelty and patentability of the claimed invention. In order that our readers may understand the case, it is necessary for them to bear in mind that licorice or some other moist and sweet substance is used in the manufacture of plug or bunch chewing tobacco, in order to impart moisture and sweetness to the manufactured article. The preservation of these two qualities is greatly desired by the consumer. When tobacco is thus prepared there is danger that the moist tobacco, if exposed to the air, will ferment, or will mould and "dry-rot." It is, therefore, important to make the plug or bunch as compact as possible, in order to preserve moisture and prevent mould. Before the date of Eppinger's invention, this kind of chewing tobacco was made by enclosing strands of sweetened "filler" tobacco in a binder. The wrapped tobacco was then spun upon a wheel, or twirled or rolled by hand into a roll, and, after being incased in a wrapper, was coiled and packed for market; or was subjected to extreme heat, and afterwards to pressure, before being put up in packages. Moisture was removed by this "hot-house" process, and thus danger of fermentation was obviated, but the quality of the tobacco was made inferior Another method of manufacture was by incasing the sweetened filler strands in an unsweetened binder, and also in a wrapper. The rope was then bent and braided, and the two ends of the braid were fastened by a cap of wrapper tobacco. The braids were subjected to sidewise pressure, but could not be subjected to pressure endwise, in consequence of their shape, and therefore were not compressed sufficiently to exclude the air, and the tobacco was liable to become mouldy. Each braid soon became quite dry in the pocket of the consumer, and lost its flavor.

Eppinger's method is to envelope the "filler" tobacco, treated in the usual way, in a "binder," which is a brighter and larger leaf, and around the binder he wraps what is called a "bright wrapper leaf," which is used in its natural condition without treatment. The rope thus formed is, in fact, a long flexible cigar, with a sweetened filler. This rope or strand is then coiled into a bunch around a central core, one end of the rope, either single or doubled, serving for the core. Several of these bunches are placed on their ends in a strong receptacle, of suitable shape, and a follower is then forced down with great pressure upon them. After about twenty minutes the follower is removed and the bunches are taken out and replaced in the same receptacle on their sides, and side by side, and pressed again in like manner. The claim of Eppinger's patent is for: "Plug or bunch tobacco made as herein described, the same consisting of a rope or strand composed of a sweetened or prepared filler inclosed in a binder, in turn enveloped in a wrapper, the said rope being coiled around a central core, forming a continuous part of the rope, and the bunch thus made being subjected to a pressure, as and for the purposes set forth."

The advantages of Eppinger's method are very marked. The moisture of the tobacco is preserved. Air and dampness are excluded by the compactness into which the tobacco is pressed. The tobacco, so put up, can be shipped to warm or damp climates without liability to detericrate by mould, and a single coil can be carried in the pocket of the consumer without becoming dry or friable.

The utility of the patented article was clearly proved. The evidence showed that it had had a very large sale, and had commanded a much higher price than the same quality of tobacco when put up in any other form.

The novelty of the invention was also clearly proved The patented article manifestly differed from the ordinary spun or rolled plug tobacco, in this, that in such tobacco the filler and binder were rolled together, while in the patented article the binder simply encircled the filler. "Twist"

or "braid" tobacco was made in the same manner as the patented article was made—by encircling the sweetened filler with two separate wrappings of unsweetened tobacco—but the twist tobacco was simply braided and subjected to lateral pressure. Each plug was a flat braid, into the interstices of which air freely entered; and having a comparatively thin and flat surface, the plug could not be made compact by endwise pressure.

The important question in the case was as to the patentability of the invention. A rope of strands of sweetened filler, inclosed in a binder, which, in turn, was enveloped in a wrapper, antedated the patent. Plug tobacco had always been coiled and braided in various forms, and had been subjected to pressure. The peculiarity of the invention was, therefore, in the form and shape of the coil.

The argument on behalf of the defendants was that the combination filler, binder, and wrapper was old, which was true; that coiling or twisting a moist rope of tobacco had always been practised, which was true; and that subjecting a coiled rope of sweet tobacco to pressure was old, which was also true; and that the particular form of the coil was a matter of fancy, and that the form of the coil could not involve the exercise of the inventive faculty. This was the precise question at issue. Could any particular method of coiling be the subject of a valid patent?

The court, in sustaining Eppinger's patent, answers this question in the affirmative. It holds that the article of plug tobacco had been long in use, and in constant demand; that, as it had been prepared for market previous to Eppinger's invention, it had been liable to spoil in warm and damp weather, and to grow mouldy in any temperature; that no remedy was found for these evils until Eppinger's invention was made; and that it was manifest from the length of time during which the tobacco had been manufactured, from the constant demand for it, and from the well known evils to overcome, that the inventive faculty must have been brought into exercise, or else that mechanical skill would long since have avoided any danger of fermentation or mould; that, however simple Eppinger's change in the method of manufacture apparently may have been, yet it was a change which required invention for its accomplishment; and that the improvement resulting from the changed method of manufacture had been so great that the article which was produced was, in the meaning of the patent acts, a new and useful article of manufacture.

THE PROPOSED AMENDMENTS TO THE PATENT LAWS.

We give below an abstract of the new patent bill which has been introduced into the Senate by Mr. Wadleigh.

The first section enacts that from and after the passage of the act no profits or damages in any suit for infringement of a patent shall be recovered which shall have accrued more than four years next preceding the commencement of such suit, and that all rights of action at present existing must be sued for within four years thereafter. Under this section, if there are a hundred infringers of a patent, a hundred suits must be brought at once to fully protect it; or if an eastern man has a patent, and some one in the extreme west wishes to manufacture the patented article, he may do so for many years before his operations are discovered, and the owner of the infringed patent has no right to recover any damages accruing to him from the infringement that occurred more than four years before suit is brought.

Under the second section a license fee is to be the measure of damages which a patentee may recover from infringers, provided any such license fee has been established; but if not, where from the nature of the invention it *can be made to appear* to be for the interest of the patentee that other persons should use the same, the court or jury shall determine the damages from the evidence, and in such case no account of profit or savings is to be allowed. Where profits are to be taken into consideration, the defendant is not to be charged with any saving he may have made by infringing a patent, unless it can be shown that he has made money by his business. Where he acknowledges that profits have accrued from his infringement, the court is to determine what proportion of the profit is due to the said invention and what to the other elements from which such profit was derived, and the proportion due to the invention is to be the measure of profit recovered; but if said profits shall be found to be in *excess of the injury* done by the infringement, the court is to diminish the amount to such an extent as may be just and reasonable. This last clause appears to be open to the interpretation that, if the defendant can prove that from want of means or otherwise the patentee was in such a position as to be unable to use his invention, and was not therefore actually *injured* by the infringement, notwithstanding the infringer may have made an immense profit from the use of it, unless it can be shown that the inventor actually suffered great injury, he is to be cut down in the profits to the amount of injury he has suffered.

Section 6 has a clause to the effect that no machine or other article made prior to the surrender and reissue of a patent which did not infringe such surrendered patent, shall be held to be an infringement of the new claims of the reissued patent.

Section 9 allows infringers, where a patentee does not bring suit immediately he has knowledge of infringement, to bring a bill in equity to declare such infringed patent void for any of the causes which by law may render the same invalid. So that in case a patentee is too poor to immediately bring a suit against a wealthy infringer of his patent, said infringer may bring suit to declare it invalid; and in nine cases out of ten where the owners are too poor to employ good counsel to protect their rights, perfectly valid patents would be declared void under such circumstances.

Section 10 is to compel patentees to bring suits to enforce their rights, if an infringer demands that a suit be brought no matter whether the patentees have means to bring such suits or not, under the penalty of being enjoined from ever prosecuting such infringer at any time thereafter.

Section 11 is an imitation of the English law in the matter of fees, as it requires that a patentee shall pay fifty dollars on or before the first day of January after the expiration of four years from the date of the patent, and one hundred dollars on or before the first day of January next after the expiration of the ninth year of the patent. In default of either of these payments, the patent is to expire on the 1st day of April next thereafter, and during that month the Commissioner of Patents is to publish a list of the patents that have expired for the non-payment of these extortionate fees. In view of the fact that there is now in the Treasury of the United States over a million of dollars wrung from poor inventors in the shape of unnecessarily high patent fees, we think comment on this section entirely needless.

HOW TO TRUE UP A CRANK PIN.

A correspondent asks: "How can I true up my crank pin? I do not think it is true, because it appears to pound at two opposite parts of the stroke, and if I tighten up the brasses enough to take the pound out they get hot. I cannot find anything on the subject in the books."

One of the most prevalent faults of construction in stationary engines is a slight want of truth in the crank pin, and the result is just such as our correspondent has described. The cause may lie in either of three things, first, the two holes in the crank not being true, one with the other; second, leaving too much for the shrinkage of the large hole of the crank upon the shaft; and third, not properly fitting the key to its seating. If in boring the holes the same back of the crank, whether planed true or not, and although set as true as practicable the holes will be out of true, one with the other, to twice the amount that the chuck plate of the lathe may be out of true and twice the amount that the casting may alter in form from having its surface skin removed, the crank pin hole should be bored with the face which was turned up when the large hole was bored clamped to the face plate.

We may next consider the amount of shrinkage. If it is excessive, the metal must give way in the cooling process, and will yield the most where the metal is the weakest, throwing the crank pin end out of true. The proper amount to allow upon a crank of any size less than about 7 inches is just such as can plainly be perceived by setting the inside callipers, or a wire gauge, to touch very lightly the bore of the hole. The outside callipers or gauge having a barely perceptible contact, daylight should be just plainly visible between the gauge and the wire or inside callipers. Rules are given in books for the proper amount of allowance, but it is expressed in decimal parts of an inch, running to three places of decimals, and the machinist has neither inside nor outside callipers which will measure determinately such large sizes to such minute fractions. For steel tyres upon locomotives and other wheels, in which the amount allowed for contraction is very important, the heavy duty causing the tyres to break from the strain due to too much contractive tension, the following device has been employed: A piece of steel, say 8 inches long and an inch wide, is filed as thin at one end as the least amount of contraction and a little thicker at the other end than the greatest amount of contraction required upon such sizes of work as the gauge or wedge is intended to be used for. Upon the face of the wedge is marked a series of lines running across it at places where the thickness of the wedge represents the proper amount of contraction for the diameter which is marked upon each line. All, then, that the operator has to do is to find upon the gauge the line which is marked with the diameter of the wheel and to then set his wire gauge to fit the male gage or callipers with the wedge interposed at one end, the wedge having just contact with the two when inserted up to the line. This is a very accurate method, and is to be commended for the ease with which it can be applied. We now come to shrinking the crank on to the shaft. For this purpose care should be taken to heat the crank slightly more on the thick than on the thin side, and to make it to a very low red heat indeed—in fact, a just perceptible red heat is best. The crank should lie, while cooling, with the crank pin end vertically beneath the shaft, so that its weight may not tend to warp the crank in cooling, as it would do if lying horizontally.

In fitting the key it should not be driven in tight, because it is apt to spring and show unnatural bearing marks. Towards the finishing process it should be drawfiled, to ease the bearing marks, lengthwise, as that will make it drive easier and smoother. If the key is not fitted to bear exactly even all over the driving, it may spring the crank out of true.

If these instructions are carefully followed the job will be a true one, and there will be no possibility of the crank pin causing a pound in the engine. To remedy a pound in an engine we may proceed as follows: To test the truth of the crank pin we attach the crank pin end of the connecting rod in its place with the brasses and key properly adjusted. The other end of the connecting rod should have the brasses and key in place but should not be attached to the wrist pin, or gudgeon, as it is more properly termed. We now place the crank pin at one end of its throw and lower the connecting rod at the other end into the wrist pin bearing and note if the faces of the brasses fall, without the rod being sprung sideways, exactly true into the wrist pin flanges. We perform this testing operation with the crank pin at the four quarters of its revolution, moving the crosshead to the necessary position in each case. And it is obvious that if the crank pin is true the other end of the connecting rod will fall exactly true into the wrist pin bearing; but suppose that when the crank pin is on one dead center the connecting rod brass flanges fall outside, and when it is on the other dead center it falls inside of the wrist pin bearing, it proves that the crank pin does not stand true. If when the crank pin is on the dead center nearest to the cylinder the brass flange falls inside the wrist pin, the outer end of the crank pin inclines towards the cylinder, and *vice versa*, if the brass flange falls outside the wrist pin bearing, the outer end of the crank pin must incline away from the cylinder. Here it may be noted that if the main shaft is not at a right angle to the center line of the bore of the cylinder, the connecting rod applied as above will not fall into the wrist pin bearing; but in this case the deviation of the wrist pin brasses from the wrist pin journal will be all inside or outside of the wrist pin journal, hence the operation of testing the truth of the crank pin will at the same time test the lining of the main shaft.

To proceed, then, having gone through the above operation and thus discovered in what direction the crank pin is out of true, we note how much it was out of true, which may be ascertained as follows: When it is found that the flange of the connecting rod brass does not fall into the wrist pin bearing, we mark even with face of that flange a mark upon the crosshead, and moving the crank to the opposite point in its revolution we mark another similar line, and the sum of the two distances is the amount of the want of truth at that end of the rod. To find how much that is in the length of the crank pin, we divide the length of the crank pin journal into the length of the connecting rod, measured from center to center of the bore of the brasses; the sum thus obtained we divide into the amount first obtained, and the result will be the amount the crank pin is out of line. Now, suppose the amount thus obtained is the $\frac{1}{64}$ of an inch, and that the crank pin when on the dead center nearest to the cylinder stands so that the center line of its length points toward the center of the main shaft at the flywheel end. We take a pair of callipers, set them to a diameter $\frac{1}{64}$ inch less than that of the crank pin, and file upon the crank pin journal, at its outer end, a flat place of sufficient depth as to make the callipers just gauge correctly. This flat place must get shallower as it approaches the other end of the journal, until at the extreme of the other end it runs out, leaving the surface intact. We next file a similar flat place upon the inside end of the length of the crank pin journal, but on the opposite side of the diameter of the crank pin, that is at the end of the crank pin journal nearest to the crank and on that part of the perimeter nearest to the crank shaft center; this second flat place must be filed at that end enough to allow the callipers to gauge correctly at that end, and must disappear at the other end of the journal. Thus we have obtained two diametrically opposite flat places that are true with the center line of the length of the main shaft, and we may now file two more flat places on the crank pin journal, the faces of the four forming a square. The last two, however, must be filed to an equal amount from end to end of the journal, and equally deep on each side, until the callipers will gauge them correctly. This being done, we file up the protruding parts of the journal until one of the brasses rubbed upon the journal will mark evenly all round, and the flat places are just brought to a bearing, and the job will be complete. It is necessary to connect the rod again and go through the testing process the same as at first, to be sure that all is right.

J. R.

MORE NEWS FROM THE SUN.

We noted recently the fact of Dr. Janssen having obtained some exceedingly large and fine photographs of the sun, and that it was probable that by means of the facility which these afforded for observing the solar surface, new deductions concerning the nature of the latter would probably be reached. Dr. Janssen's photographs are some 15 inches in diameter, and show details of the mottling or willow leaf on the sun of less than 1 second of arc. By examining these points, Dr. Janssen has recently found that the surface of the photosphere has not a constitution uniform in all its parts, but that it is divided into a series of figures more or less distant from each other and presenting a peculiar constitution. They have contours more or less rounded, often very rectilinear, and resembling polygons. Their dimensions are variable, and they sometimes attain a minute or more in diameter. In describing the figures in *Nature*, Mr. J. Norman Lockyer says, that "while in the intervals between them the grains are clear, though of variable size, in the interior the grains are as if half effaced; for the most part indeed, they have disappeared to make way for trains of matter which have replaced the granulation. Everything indicates that in these spaces, as in the penumbræ of spots, the photospheric matter is submitted to violent movements, which have confused the granular elements.

Mr. Lockyer considers the discovery as confirmatory of his opinion that sun spots are an index and not a measure of solar activity; and that their absence indicates a reduction, not a cessation, of the sun's energy. Dr. Janssen also points out that this fact throws light upon the forms of solar activity, and shows that that activity, in the photosphere, is always very great, although no spot appears on its surface.