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(Illustrations are indicated by an asterisk.)

THE PRESSURE ON A SLIDE VALVE.

It is a popular idea that the number of square inches in the back of a slide valve, and the pounds of steam in the chest, represent the total pressure upon the valve. Another delusion is, that the pressure on a slide valve is equal to the pounds of steam per square inch on the back, minus the area of the steam ports. If we consider the valve to be a solid block of iron on a solid table, and mechanically tight, the steam would press on every square inch of surface with the same force that a dead weight laid upon it would. But these conditions are never found in a slide valve, except in one position; that one, when the valve laps over both ports, and the engine is at rest.

So soon, however, as the valve is moved the steam enters the open port and the pressure is practically taken off that end of it. When the valve is moved back over the port, the steam that is shut up within the cylinder will press up against the under side of the valve face with a force exactly equal to the pressure at the point in the stroke of the piston at which the valve closed. As the valve continues its stroke the other port will be opened, and the steam we have supposed shut up in the cylinder begins to exhaust; at this time, the pressure against the under side of the valve will be the pressure in the cylinder at the end of the stroke. This pressure is only for a brief period, however, for in a well constructed engine the time of exhausting the contents of the cylinder is very short. While the steam is entering the open port, then, and after the exhaust has passed through the closed port, the pressure on the under side of the valve will be just the ordinary back pressure, supposing the engine to be non-condensing—which is the supposition we have entertained in this discussion.

It is therefore unquestionable that to determine the pressure on a slide valve we must consider the pressure in the cylinder at the time of cutting off, at the end of the stroke, the area of the ports, the area of the back, and the back pressure on the piston.

THE REPORT ON SCREW THREADS.

The mechanical readers of this journal will be interested in the report on screw threads from the Committee of the Franklin Institute, which we publish in another part of this issue.

In common with the trade we have felt the necessity of reform in this particular, and have lost no opportunity of calling attention to it.

In regard to the decision of the Committee we think it a wise one, and a happy conclusion of an arduous duty. They recommend the adoption of the V-thread, flat on top, and flat in the bottom of the space, with pitches varying, of course, with the size of the bolt. The standard can be found in the report.

The thread recommended for adoption has for a long time been the most popular with good mechanics, as a fair compromise between a square and a triangular thread, also on account of the ease with which it is made and its durability, so that there will be no prejudices to overcome, and the adoption of it is more likely to meet with favor than a rounded top and bottom thread, which was properly discredited. Threads of this class, when new, always look as though they were half stripped, and they tend to strip quicker than others, for the very act of stripping is caused by one thread mounting or riding over the other; rounded threads facilitate this very greatly, especially with fine pitches.

In regard to the sizes for rough and finished nuts, there are some who will disagree with the decision of the Committee. They recommend that finished nuts and bolt heads be one-sixteenth smaller every way than rough nuts. It frequently happens that rough bolts and nuts are in close proximity on the same machine. If a rough five-eighth bolt head, with a finished nut is used, as is often the case, there is a difference in proportion apparent at once, and two wrenches must be provided where one would suffice. One wrench must be used for the rough bolts and another for the finished ones, and it is more likely that the largest wrench will be frequently used by careless men, on the smallest nuts, so that the corners will soon be rounded off. If we suppose that screw wrenches are always at hand, then these objections have no weight; but wrenches of that class are not always to be had, and when we speak of wrenches, it is of permanent ones, which are always sent with machines. There should be but one size for rough bolt heads and nuts and finished nuts; the excess for finishing should be allowed in forging, but should not be put forth as a standard. Since nuts are for the most part made in dies, now-a-days, there would be but little difficulty from want of exactness in the angles, so that the wrenches would fit. We have no disposition, to be hypercritical, however, and congratulate our mechanics that they have fallen into the hands of such able advisers on this subject, as composed the Committee, and not into the toils of schemers and theorists who would have confused instead of making the subject plain and practical.

THE FIELD OF INVENTION INEXHAUSTIBLE.

We have good reason to congratulate ourselves, as a people, upon the degree of perfection to which our inventors have brought domestic utensils. There is scarcely an article in common use which has not been very greatly improved within the last few years. Indeed there are many things entirely new and original in conception which add very much to the comfort and convenience of housekeepers.

Bread kneaders, knife scourers, potato mashers, butter workers, laundry stoves, adapted specially for heating sadirons, mechanical coffee roasters, pans for baking rolls so that an inviting and toothsome crust is left on all parts, top and bottom and sides, cleaners for kerosene oil chimneys, these and similar articles abound, and the modern American kitchen is incomplete without them.

Very many persons imagine that after one thing of a kind is invented every one else is excluded from that field and must ever after sit down and fold their hands, or else cast about for something as yet untried. This view is an erroneous one. Sterne, a modern English writer, makes one of his characters, "Uncle Toby," say to an intrusive fly which he is putting out of the window—"Go, the world is wide enough for me and thee." It is the same with invention, the world is wide enough for all, and it is not every article that suits all tastes.

It is fortunate for the general welfare that this is so, otherwise there would be no trade except a limited one, and the arts would come to a stand still. Every person who has any device for lessening or expediting work or performing it in another manner should see that it is brought prominently before the public without delay.

THE Chicago-Lake-Erie tunnel progresses at the rate of twelve feet in twenty-four hours.

IMPORTANT ENGLISH PATENT LAW CASE.

We are indebted to Mr. Hayes, Chief Clerk of the Patent Office, for the report of proceedings in the Court of Queen's Bench, on a demurrer, to the declaration in a petition of right claiming damages against the British Government for infringing a patent granted to Robert B. Feather for certain improvements in the construction of ships. The report of the trial was forwarded to Mr. Hayes, by George J. Abbott, Esq., U. S. Consul at Sheffield. The patentee claims to effect considerable economy in the building of ships or vessels, and at the same time add to the strength, buoyancy, and durability, and also to secure them against more extensive or fata injury arising from leakage in the constructing of ships or vessels of wood and iron combined, or what the patentee terms union-built vessels. The bottom and lower part of the frame of the hull of the vessel is to be constructed of timber, as heretofore, to about one-half, more or less, of the perpendicular hight of the vessel, exclusive of the bulwarks or top sides. From that point or mark, upwards, the vessel must be constructed of iron. To carry out this object sheets or plates of iron are raised upon stanchions or ribs made sufficiently strong, and formed with equalized saddle bars, set across the timber heads, main walls, and ceilings, over the futtocks to the keel inside, and outwardly as low as necessary, and firmly-bolted through them; or if preferred or considered more advantageous, the iron ribs or stanchions, with requisite receiving plates, could be introduced at suitable distances as for entire iron vessels. The intervening spaces between the ceilings and the walls are intended to be filled in solid to a sufficient depth to receive the bolts and fastenings of the iron ribs or stanchions, the upper portion of the main walls being laid diagonally either way, with a view to increased strength. The stem and stern post to be entirely of timber or of iron from the line of the union streak upwards.

The petitioner claimed damages to the extent of £10,000 sterling for infringement of his rights.

The Attorney General, who appeared to support the demurrer, argued, first:—"That these Letters Patent of inventions—and particularly this now before the court—are to be construed according to the general principles of law applicable to Crown grants, and that being so they will be found not to restrain the Crown from using an invention, or the grant of any privilege whatever as against the Crown. Second—That if the contrary construction were put upon such Letters Patent, particularly like that in this case, which relates to alleged inventions of the naval and military defence of the country, such Letters Patent would be against public policy and simply void as to restraining the Crown from its use. Third—That when we come to examine the statutes and authorities as to Letters Patent of inventions they will be found to contain nothing to invalidate but rather to support that conclusion. And, lastly, I submit if these arguments should fail to recommend themselves to your judgment, and you should hold against me on every one of these points, then the necessary consequence of such a conclusion is that the Crown is not liable on a petition of right; but if wrong has been done by individuals, whether by the Lords of the Admiralty or any other persons—if that be so, then the remedy is not by petition of right against the Crown, but by action against those who did the supposed wrong."

Mr. Bovill, who appeared for the petitioner, contended that there was not a trace in the experience of any living man of the Crown having asserted its right to use patents without payment to the patentee. And the astounding proposition is announced now for the first time that the Queen is entitled through the public departments to take what is the supposed private property of individuals and appropriate it without remuneration. In 1816 Sir William Congreve, who was then the director of the Artillery Department at Woolwich, was restrained from the use of Mr. Walker's patent. Sir William Congreve had supplied certain articles, and he was charged with a breach of the patent, and he was restrained by injunction, but it was not set up that Sir William Congreve was at liberty to use the invention for the good of the public service. Lord Eldon considered Sir William Congreve was not entitled to use the patent, but from the urgency and necessities of the case he was allowed to supply the articles for the