Impromptu Ingenuity.

Some years ago, a Spanish steamer, while crossing the Bay of Biscay in a severe storm, gave such indications, by an unusual noise at the stern, that there was something wrong with the screw propeller or its shaft outside of the ship—that is, in the open space between the stern and rudder posts where the screw revolves. There was no dry dock in any of the ports on the coast where the ship could go to be examined; and on arrival at Vigo it appeared as if there was no alternative but to remove the cargo from the stern, and by placing it forward thus lift the screw propeller and shaft to the surface of the water. The alternative, simple as it was, meant a serious delay and great expense. Before commencing to remove the cargo, another consultation was held. It was then decided to put the stern of the ship over a bed of light colored sand; and as the water was very clear, there might be a possibility of ascertaining the extent or cause of the mishap. For two days after the vessel was so placed, the wind caused a ripple on the water, which effectually prevented anything being seen. It was then suggested by some one on board to try the use of oil on the surface of the water round the stern of the ship. The effect was most satisfactory. The water was becalmed as if by magic, and it was then seen that the wedge or key which keeps the propeller in its place on the shaft had come partly out, and thus left the screw loose on the shaft, which caused the noise. By continuing the use of oil for a few hours the wedge was ultimately driven into its place and secured. Many days of detention and the use of costly appliances and labor were thus saved.

A few years ago an iron bridge of considerable length, the weight being about two hundred tons, was constructed in England, and erected in a remote part of Germany. By some mishap, the bridge, when finished, was found to be some distance "out" to one side, an error which the proprietors insisted should be rectified. To take down and reerect the bridge would be simply ruin to the contractor. But necessity is the mother of invention, and so it proved in this case. It was summer time, and the contractor proceeded to find the amount of expansion which was caused by the heat of the sun over the whole length of the bridge. He next ascertained what contraction took place in the night by cooling. Armed with these data he thought it might be possible to bring the bridge to its proper position in a few days. The bridge, of course, in its ordinary condition, expanded from the center, pushing its two ends outward, or farther apart, and again contracting toward the center. Taking advantage of these conditions, one end was made fast in the morning, and the bridge was forced to expand from that immovable point, instead of from the middle, as formerly. When the iron composing the bridge had expanded to its full extent in the direction intended, that end was released, and the opposite end made fast. The bridge then contracted toward its true position. Thus, whatever was gained by the day's expansion was secured by the subsequent contraction when the metal cooled at night, and the process being renewed day by day, the work was successfully accomplished.

An ingenious application of expansion and contraction in metals was made use of in France, and has frequently been taken advantage of since. The walls of a large building in Paris were observed to be giving way by bulging outwards, and the problem was to bring them back to their vertical position. For this purpose a number of bars of iron having screws and nuts on each end were let through the opposite walls and across the intervening space between them. The nuts and screwed portion of the bars were outside. The bars were now heated by a number of lamps suspended below them until they had expanded as much as possible, and the nuts screwed up against the outsides of the two opposite walls. The lamps were next removed, when the heated bars, in cooling, gradually contracted in their length, bringing the walls very gently, but with irresistible force, into their normal position.

It is well known that in working iron, such as welding two pieces together, and even in its manufacture, hollow places or flaws occur, with merely an outside skin over the defective parts, which any test but a destructive one would fail to discover. Nor would it be difficult to point out numerous examples of disaster thus occurring. To test the homogeneity of the metal, a bar of iron is placed on the equatorial line. A compass with a very sensitive needle is passed along in front of the bar, the needle of course pointing at a right angle to it. If the bar is perfectly solid through its whole length, the needle will remain steady. If, however, there should be a flaw or hollow place in the bar, the needle will be deflected as it passes from the solid to the hollow place, *backward* toward the solid iron; passing on over the hollow place, the needle will come within the range of the solid iron at the other end of the flaw, and will again be deflected *forward*. If the bar be cut through anywhere between these two points of deflection, a flaw will invariably be found. Many thousands of pieces of iron—some prepared for the purpose of testing this method of trial, others in the ordinary course of business—have been operated upon with the same unvarying result.

A striking instance of ingenuity in taking advantage of the resources of nature in an emergency, is found in Sir Samuel Baker's account of his travels in Abyssinia. His stock of soap had become exhausted; and as he possessed abundance of various kinds of fat, including that of elephants, hippopotami, lions, and rhinoceros, he determined to convert a quantity of this grease into soap. For this purpose he required both potash and lime; and how were these to be obtained? The negleek tree, he found, was exceptionally rich in potash; he therefore burned a large quantity, and made a strong lye with the ashes, which he concentrated by boiling. There was no limestone; but the river produced a plentiful supply of oyster shells, which, if burned, produce excellent lime. What was next wanted was a kiln in which to burn the shells, and this he constructed out of one of those great ant hills, which rise to ten feet high, common to those valleys, and which possess a very hard external crust. Two natives hollowed out one of those hills; a proper draught hole was made below from the outside; it was loaded with wood, and filled with some six bushels of oyster shells, which were again covered with fuel; and after burning twenty-four hours a supply of excellent lime was obtained. Then commenced his soap boiling, which was effected in a large copper pot of Egyptian manufacture. The ingredients of potash, lime, and fat were then carefully mixed; and after boiling ten hours, and having been constantly stirred, he obtained excellent soap, of which he had in all about forty pounds weight.

National Value of Cheap Patents.

At the December 6th meeting of the Society of Engineers, London, Mr. Joseph Bernays, President, in the chair, a paper was read by Mr. Frank W. Grierson on "The National Value of Cheap Patents." The author pointed out that inventors, like all other men, did not work for the mere sake of working, but for their own advantage. In obtaining an advantage for themselves, however, they conferred upon the whole nation a much greater advantage. The advantage an inventor sought was secured to him by a patent; patents should, therefore, be granted at as low a cost as possible. A patentee was desirous of providing improved processes and means of doing what had not before been possible; or of doing something in a quicker and more economical manner than had before been possible. Inventions were very seldom "happy thoughts;" they were nearly always the result of much consideration and many experiments, neither of which would be undertaken for the mere love of the work, but which were undertaken in the hope of reward in the form of a successful patent. The patentee had an obvious incentive for getting his invention known and adopted; if it was not an improvement it would certainly not be adopted, but if it was, it would be adopted only in consequence of his persistent efforts, and by its adoption a step in advance had been made.

After referring to the evil of "orphan" inventions, the author gave the details of the stamp duties on British and American patents, from which it appears that the stamp duties on a patent in that country, lasting only 14 years, are 175*l.*, while those on an American patent, lasting 17 years, are only 7*l.* A table was then given of the patents applied for and granted in the United States and in Great Britain during the last ten years, from which it was shown that the 50*l.* stamp duty at the end of the third year kills about 70 per cent of the patents granted, and that the 100*l.* duty destroys very nearly 20 per cent more, leaving only 10 or 11 per cent to complete the full term. The effect of these crushing duties is that while on December 31, 1879, there were in Great Britain only 15,755 patents in force, in the United States there were more than 200,000, not including designs. The United States thus have thirteen times as many patents in force at the same time, and therefore make thirteen efforts to advance for each one that the English make. During the last ten years 22,868 British patents have been crushed by the heavy stamp duties. An American patent, once granted, lasts the full term without further payment. The result of this is seen in an enormous import of American goods of varied description, and in the continued flow of skilled artisans to America. Mr. Grierson then gave the following comparative table of average results for the last ten years:

	British Isles.	United States.
Receipts	158,280*l.*	143.049*l.*
Expenditure	48,063*l.*	125,254*l.*
Profit	110,217*l.*	17,795*l.*
Stamp duties on one patent	175*l.*	7*l.*
Maximum duration of patent	14 years.	17 years.
Average " " "	5 "	7 "
Number of patents applied for	4,496	19,770
" " " granted	2,980	13,335
" " applications refused or abandoned	1,516	6,415
" " grants paid 50*l.* duty	820	
" " " " 100*l.* duty	253	
" " " killed by 50*l.* duty	1,851	
" " " " " 100*l.* duty	436	
Percentage of applications granted	66·28	67·55
" " " refused or abandoned	33·72	32·45
" " grants paid 50*l.* duty	30·70	
" " " " 100*l.* duty	11·18	
" " " killed by 50*l.* duty	69·30	
" " " " " 100*l.* duty	19·52	
" " " lasting full term	11·18	100·00
Population	34,500,000	50,900,000
Number of persons to one patent granted	11,577	3,811
Ratio of amount of duties on one patent	25	1
" " number of patents granted	1	3
" " " " " in force	1	8
Average cost to inventor for one patent, including patent agent's charges	190*l.*	19*l.*
Technical examination of applications	None.	Careful.
Inventions invalidly repatented	Frequently.	Rarely.

Mr. Grierson went on to observe that this table showed that in the United States three patents were granted for one there, after allowing for the difference in population, and that the stamp duties on one patent there would pay those on twenty-five patents in the United States. We might, therefore, fairly say that the British inventor was handicapped 25 to 1 in favor of the American inventor. It was to be carefully remembered that in handicapping the inventor they handicapped the nation. The author drew attention to Mr. John Standfield's proposal for reduced stamp duties, which was as follows: On application (to cover cost of provisional protection), 2*l.*; on filing complete specification (to cover cost of printing, etc.), 3*l.*; total, 5*l.*; there should also be an annual tax of 1*l.* Provisional protection to be granted for one year, and the duration of patents to be twenty-one years. After remarking on the advantage of official technical examination of applications, the author pointed out that it was impossible to calculate the enormous indirect loss the nation suffered from the present exorbitant patent stamp duties, which drove abroad and stifled a large proportion of that inventive faculty upon which alone they were dependent for holding their place among the nations, and which might, if not so hampered, save a considerable number of lives now annually lost in preventable accidents, and might give employment to many who are now unable to obtain work, and who in consequence have to be supported in idleness.

DECISIONS RELATING TO PATENTS.

United States Circuit Court.—Southern District of New York.

MATTHEWS *vs.* SCHONEBERGER *et al.*—PATENT BOTTLE STOPPER.

Blatchford, J.:

1. Every claim of a patent has reference to the descriptive part of the specification, and must be construed as if the words "substantially as specified" formed part of said claim.

2. So where the specification speaks of a part or feature of the patented device as being "an important feature of the invention," and makes it a part of the claim, the omission of such feature from defendant's device saves him from infringing the patent.

3. Where a prior device accomplished the same thing, but not so perfectly as the patented device, the claim to the latter must be limited to its precise construction whereby it accomplishes the results more perfectly, and will not include other means of doing it.

4. A function cannot be claimed. The claim must be either to the physical structure, the combination of devices, or the method of operation.

5. The Codd bottle stopper, consisting of a glass marble inside of a bottle seating against a rubber seat in the mouth of the bottle by the pressure of gases from within, is not an infringement of the Albertson patents for a gravitating stopper consisting of a stem with a rubber valve or skirt around it, which seats on the interior of the neck of the bottle.

This suit was brought on two patents. One of them is a reissue, No. 2,386, granted to the plaintiff October 30, 1866, for an improvement in bottle stoppers, the original patent having been granted to Albert Albertson, as inventor, August 26, 1862. This patent has expired.

The second patent sued on is No. 44,684, granted October 11, 1864, to J. N. McIntire, on the invention of Albert Albertson, for an improved method of stopping bottles.

Bill dismissed.

Concrete Blocks.

In reference to the art of concrete block building, Mr. Imrie Bell, of London, has been much struck by the want of attention paid to the art of producing a fair and finished surface in the exposed faces of the blocks, as exemplified in many of the large engineering works in course of construction in the metropolis and elsewhere, where the exposed faces of the concrete present a rough honeycombed appearance, with the marks of the joints of the timber planks forming the moulds in which the blocks have been formed, or the frames inside of which they have been built *in situ*, in place of showing a fair and smooth surface. The author has given this matter much consideration, and the result of his experience is that in concrete building it is perfectly easy, with a little attention, not only to produce a fair surface, but to form mouldings and panels, and even tracery and ornament, and at the same time make this face work as durable and solid as any part of the block. There are two reasons why little attention has hitherto been paid to this art—one is carelessness or indifference to appearance, the other is that most engineers who have attempted it have done so by "rendering," a most objectionable and dangerous mode of effecting the object; and which, even if successful for a time, is simply veneering, and is subject at any time to decay, the failure generally occurring after wet and frosty weather, which has naturally caused a want of confidence, and stopped a repetition.

The plan which the author has followed, and with complete success and at an inappreciable increase of cost, by which a smooth, uniform, and equal colored face can be obtained (and if wanted, the color of the blocks might be slightly varied by different colored sand), and which, both above and below low water, has stood successfully the test of eight years' exposure to frost, heat, storm, and rain. This plan is simply to have a smooth-planed board for the face of the mould painted previous to commencing the work with a mucilage of soap, and to line inside with a finer concrete or mortar as the work proceeds, so that the mixture placed close to the face boards is carried up with that contained in the body of the block, the whole forming one homogeneous mass, and insuring that the setting process of the whole mass shall progress simultaneously: and in fact this face, like the skin of cast iron, is actually the strongest portion of the block.