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Contents:

(Illustrated articles are marked with an asterisk.)

A SYSTEM OF GAGES FOR IRON WORK.

The gas-fitters of this country and Europe, or, at least, England, agree on a system of threads for various sizes of pipes. If a gas-man is told the size of a gas or steam pipe, he knows the number of screw threads to the inch that is employed to fit that particular size. To be sure, the graduations of the threads might have been on a scale more easily followed than that now in use. But the system has, with its imperfections, such an advantage as to commend itself to mechanics generally.

In establishments of any considerable importance, a perfect system of gages for screw threads, gradations of drills, and of arbors, as well as of other measurements, is adopted and steadily followed. They may not, and rarely do, coincide with those adopted by other concerns. Indeed, some establishments have purposely adopted for their bolts, screws, and nuts, fractional threads, which cannot be easily mated otherwheres. Their object was to compel the owners of their tools or machines to return to them for parts or repairing. This sort of management was very short-sighted. For a time it might be profitable, but eventually those who were thus restricted, hampered, and embarrassed, ceased to patronize so selfish a policy, and induced others to follow their example.

If interchangeable parts are an advantage in the works of a single concern—if a uniform system of gages is profitable to the purchasers of one machine—why may not the same systems be of much greater benefit universally, or generally applied?

Our mechanics depend upon the public for support. Their work is intended to benefit generally the people, while it advances themselves specially. A broad, human idea will be in the long run of much more advantage to them, even, than a contracted, selfish practice.

Machines are built in one section of the country and sent to another, perhaps at a distance of a hundred or a thousand miles from the place of manufacture. They may be used where the tools and talent necessary for their repair are wanting, or, at least, where only ordinary means and appliances for such a purpose are to be obtained. In such cases the difficulties of repairing a break, or remedying a defect, are greatly increased if the parts have been made to an odd gage. Perhaps a screw is wanting and the thread is fractional; there is no remedy but to send to the manufacturers at an expenditure of time and money, which at times can be ill made.

This difficulty can be partly obviated by sending duplicates of those parts most likely to be lost, broken, or injured; but it does not cover all the exigencies which may arise. If a uniform system of gages for iron work was generally adopted, or agreed upon by the leading concerns of the country, the use of machinery would become more popular, particularly in agricultural sections, and much of the cost of repairs be saved. There can be no adequate reason why such a system should not be adopted. The clannish prejudice that seeks to monopolize all the benefits of one particular method of doing work, which is not the subject of a patent, by refusing to adopt a general design, is too belittling to measurably influence our mechanics in opposing such a movement.

CHILLED SHOT AND THE SHOEBURYNESS EXPERIMENTS.

As the facts come to hand, it is apparent that the success of the shots made by the nine-inch gun at Shoeburyness, on the 20th of September, was due mainly to the character of the projectile, and not to the gun nor the charge of powder. The Palliser shot and shell are made of chilled iron, which has been pretty satisfactorily proved to be superior in penetrating qualities to either wrought iron, ordinary cast iron, or steel. Both steel and chilled shots were used in these experiments, but while the hardened-steel shots failed to penetrate through the target, and either broke in pieces, or were compressed and bulged out of shape, every one of the chilled-iron shots did effective service, never in one instance changing in form.

The target used was about forty feet long by eight feet high, built of a single thickness of rolled wrought iron, eight inches through, bolted by the Palliser screws to a backing of eighteen inches of teak timber and an inner plate of three-quarters of an inch iron. The whole was sustained by heavy timber backs. The face of the target was not in one plane, but half of its length was inclined at an angle of thirty degrees to the other half, the line of fire being the same in both cases; so that a shot against the inclined face would make, with the target, an angle of sixty degrees. The gun was a nine-inch muzzle-loading rifle, with increasing twist of thread, throwing shot of 250 pounds with charges of forty-three pounds of powder. The distance fired was 200 yards.

The steel shot were cylinders having either pointed heads, struck on a circle the diameter of the shot, flat heads, or the Belgian or ogee head. All of them were hardened in prussiate of potash and oil, or water. Some of them were solid, others, shells with the head screwed into the body, or the base secured in the same manner. Out of twenty-four shots twelve were of this character. Not one of them passed through the target, and every one was either broken into fragments or bulged out of shape.

The Palliser chilled shots in every case penetrated the iron plate, and in one instance, on the square face of the target, went entirely through plate, backing, and lining, and lodged in a pile of iron plating, brick, and stone masonry, twelve feet in the rear of the target. In no instance was the form of the shot changed. The Palliser shots and shells have heads formed on a radius of one and-a-half diameters of the cylindrical portion. Whenever the Palliser shots struck the inclined face of the target they penetrated, while the cast-steel shots sometimes glanced off.

One circumstance in this trial is remarkable. The steel shots were so hot after striking the target that they could not be handled, while the chilled shots were barely warm. This, with the fact of the change of form in the steel projectiles, proves that much of the energy of the shot had been expended in this direction instead of in penetration.

While the velocity of the shots fired in our Fortress Monroe experiments exceeded in no instance 1,155 feet per second, that of those in this Shoeburyness trial ranged from 1,260 to 1,340 per second. At such an initial velocity, with a distance of only 200 yards between the gun and target, it ceases to be very surprising that it was possible to throw shot through such a barrier.

SOUTH AMERICAN BEEF IN ENGLAND.

In No. 14, present volume, we made a notice of several plans proposed in England for bringing the beef of South American cattle into that country in a fresh state. Among them was that of Messrs. McCall & Sloper, which was but the ordinary process of canning, so well known here, except that the meat is in no case partially cooked, and the tins are lined with a veneer of wood, for what purpose we are not informed.

By our recent English exchanges, we find the trial has been made, and has proved eminently satisfactory. On the 27th ult. a public entertainment was given, at the London Tavern, at which the courses were composed of beef from Buenos Ayres, served up in soups, steaks, roasts, boiled, stewed, in pies and puddings, and pronounced by gastronomic critics and regular "diners-out" to be unexceptionable. The chairman of the meeting stated that there were annually exported from that district of South America 2,500,000 hides, the carcasses being left to rot, or used as manure. He said, also, that the meat could be put up, shipped to England, and retailed over the counter, by the pound, at less than five pence—eight cents.

This is a subject as interesting to us as to our English cousins. The high price of beef here, especially in our cities and large towns, is alarming. Steaks from twenty to thirty cents per pound are luxuries not to be indulged in by everybody. Even corned beef retails at twenty cents. We need not go to South America to procure cheap beef, if it can be put up and transported in a fresh state. Texas is, *par excellence*, a cattle-growing country. Immense herds range over its prairies, which never find their way north except on the hoof. Here is an opportunity for some enterprising man, or a company, to benefit the community and make fortunes.

Even if we went to South America, it seems as though a very large margin might be left for profit. The price of beef which is eaten in this country, more than any other meat, fixes the price of other meats, and if this could be furnished at a cost to the consumer of from eight to ten cents per pound, the expenses of living would be very sensibly reduced.

THE SIMPSON PROCESS.

The collodio-chloride, or Simpson process for photographic printing, was published in the SCIENTIFIC AMERICAN about a year ago, and is now extensively employed in this country, especially in the production of "porcelain" photographs. It is the discovery of G. Wharton Simpson, Esq., Editor of the London *Photographic News*, who declined to take patents, but generously donated the improvement to the public service. The Simpson process consists in the addition to the common collodion of a small quantity of nitrate of silver and a chloride, which forms chloride of silver in the collodion, and imparts to it the appearance of milk. This collodio-chloride, on being poured upon paper, glass, or other substance, and dried, forms a highly sensitive and polished surface, upon which prints of great beauty may be produced, by means of a negative, in the usual manner. Applied upon what is termed "porcelain glass," the process is capable of remarkable artistic effects.

We believe that our countrymen enjoy the reputation of producing the best results in the line of porcelain pictures, and probably no one has succeeded in carrying the art to higher perfection than Mr. J. M. Herron, whose studio, corner of Fifteenth street and Sixth avenue, New York, we lately visited. It is a model establishment throughout. His porcelain specimens are among the finest that we have seen. As an operator he seems to possess the real artist feeling, and while preserving the best natural expression of the subject, produces a portrait of exceeding brilliancy, softness, and delicacy—the hard lines, wrinkles, furrows, freckles, etc., being reduced or omitted. Ordinary people are thus made to yield charming pictures, and natural beauty is exquisitely rendered. Lovers of the art will be gratified by an examination of Mr. Herron's specimens.

Porcelain pictures have the quality of exhibiting the subject both by reflected and transmitted light. Each method of viewing gives a different effect, so