IMPROVED YARN REEL AND TESTER.

The necessity for close attention to the details of cost of manufacturing, both in the matter of stock and labor, has recently received much consideration. This is especially the case in the cotton and woolen manufacture. The two engravings published herewith exhibit very important means towards greater economy in the spinning of cotton and wool, beside keeping the manufacturer informed of the actual quality of the work produced.

Fig. 1

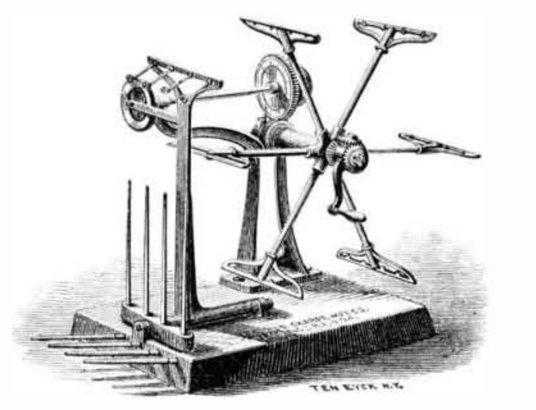


Fig. 1 shows an improved yarn reel of new design, particularly adapted for use in reeling fine cotton, linen, woolen, or worsted yarns. The reel is one and a half yards in circumference, and connects with a disk graduated into 120 parts, indicating the number of yards reeled from each spindle. An automatic feed motion lays the yarn flat upon the reel, securing accurate and uniform measurement, and consequently correct results as to stretch, strength, and numbering.

Fig. 2.

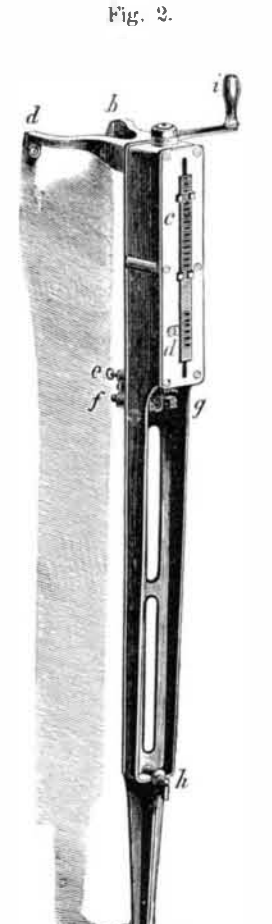
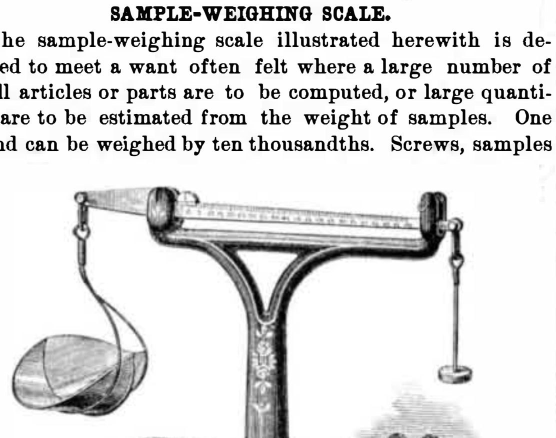


Fig. 2 exhibits a yarn tester, which is designed to test both the strength and stretch of yarns. A knot, or one seventh of a hank or skein, of yarn is first reeled and then removed from the reel and placed upon the pins, *g* and *h*. The crank, *i*, is then turned to the right until the yarn breaks. The index point, *d*, will then show the amount of stretch in inches and eighths, and the upper index, *c*, will give also the exact breaking weight in lbs. avoirdupois. The machine is adapted for a breaking weight of 100 lbs. or less, which generally includes any number of yarn above 20. If any number should exceed 100 lbs. in strength, it would be necessary to reel off only half of the amount mentioned above, which would equal 60 yards, and then multiply the weight by 2. The advantages resulting from the use of such a reel and tester will be at once appreciated by those familiar with this branch of production.

Further information can be obtained from the Brown & Sharpe Manufacturing Company, Providence, R. I., who are the inventors and makers.

SAMPLE-WEIGHING SCALE.

The sample-weighing scale illustrated herewith is designed to meet a want often felt where a large number of small articles or parts are to be computed, or large quantities are to be estimated from the weight of samples. One pound can be weighed by ten thousandths. Screws, samples



of paper, drugs, colors, etc., can be accurately weighed. It also answers for a postal scale. The finished parts are nickel plated, and the stand and base are neatly japanned and ornamented. The scoop is detached for convenience in use. Further particulars will be furnished by the Brown & Sharpe Manufacturing Company, Providence. R. I.

A SYSTEM of weather observations is now applied to the whole coast of Australia. All the stations are connected by telegraph

PATENT GAS HEATER.

The simple contrivance illustrated herewith at once explains and commends itself to those who require a ready means of heating and tempering small tools. It is intended to take the place of a forge in heating and tempering machinery and jewelers' small tools, beside being capable of use for domestic purposes, such as a nurse lamp, etc. A

piece of steel half an inch in diameter can be heated sufficiently to harden in about six minutes. It does not heat to a degree that will injure the quality of the steel, and tools heated by it will be tougher than when heated in a forge in the usual way. Darling, Brown, & Sharpe, Providence, R. I., are the makers of this article.

FISHHOOKS, JETTIES, AND MISCELLANEOUS DEVICES.

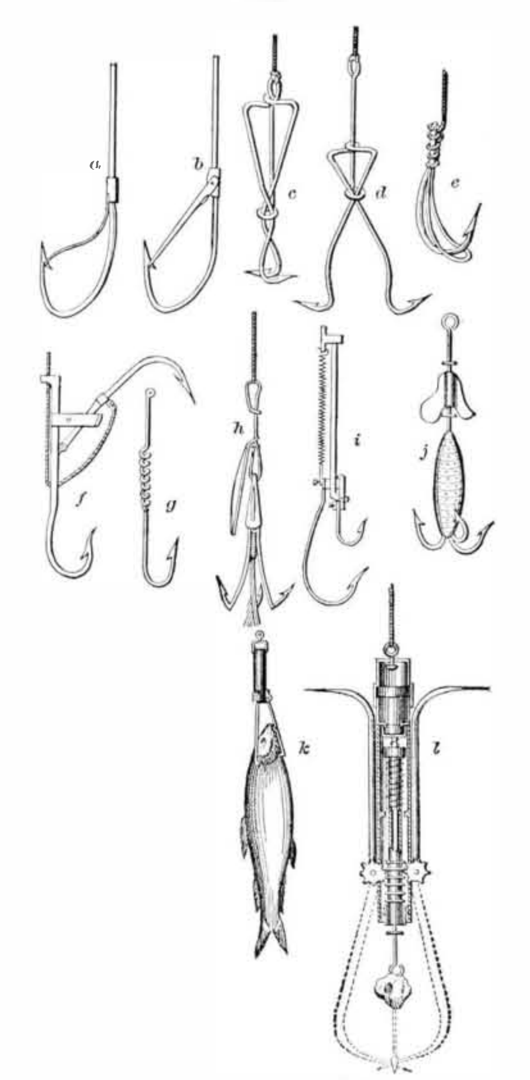
We select this week from Knight's "Mechanical Dictionary"* a number of interesting engravings relating to subjects which it is scarcely possible to classify under any one general heading. In Fig. 1 is represented a number of ingenious

FISH HOOKS.

a and *b* are two forms of spring hook in which a mousing piece engages the barb. *c* and *d* are two positions of the same hook, one set and the other sprung. *e* is intended to give the hook a square presentation, and prevent glancing of the hook in striking. *f* has a tripping hook which strikes from above, and supplements the primary hook. *g* has a spiral spring shank. *h* has a spring hook attached to the snood, which affords the means of attaching a bait or other hook. *i* has an additional hook, which is sprung, and thus supplements the primary hook. *j* has spiral vanes, so as to revolve it when drawn through the water in trolling. *k l* shows two forms—on different scales—of a spring hook whose claws are thrown down upon the fish which tampers with the bait.

In making the hooks, straight wires of the proper size and length are flattened at one end, and the barb formed by a single blow with a chisel: The point having been sharpened, the proper curve or twist is given to the hook; the soft iron is then case-hardened, to give it the stiffness and elasticity of steel, by immersion in hot animal charcoal. The hooks

Fig. 1.



Fish-Hooks.

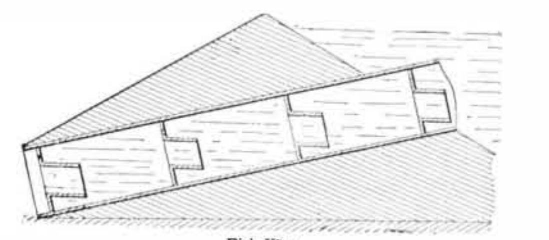
are subsequently brightened by friction, and tempered. In the hook-making machine, the wire is run from a reel into the machine, and on the other side the fish hook drops out completed, with the exception that it must be tempered and colored. After the wire reaches a certain point, the requisite length is clipped off. The next operation barbs it; the other end is flattened. It passes around the revolving dies, whose teeth, formed like the notched spikes of a wheel, catch it, and bear it from one operation to the next until it is smoothed and filed, when it passes between rollers that give it the prescribed twist and turn, and it drops into the receiver awaiting it.

*Published in numbers by Messrs. Hurd & Houghton, New York city.

THE FISH WAY,

shown in Fig. 2, is a device to enable fish to ascend a fall.

Fig. 2.



Fish-Way.

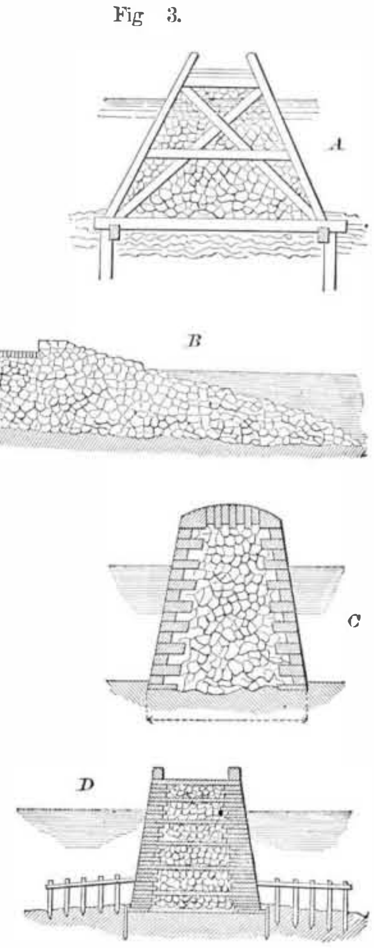
It may consist of a series of steps over which the water descends, turning a fall into a cascade, and sometimes known as a fish ladder; or it may consist of a chute with a sinuous track for diminishing the velocity and assisting the passage of the fish to the level above the dam. In the example, it is an inclined chute having a series of chambers containing comparatively still water, the current being confined to a relatively smaller space.

The success with which Captain Eads is meeting with his construction of willow jetties, at the delta of the Mississippi river, will render interesting the various other forms of

JETTIES

presented in Fig. 3. Although limited to no particular form, a very common construction of jetty is a timber framing, A,

Fig 3.



Jetties.

secured by piles or loaded with rubble. It is often built in the manner of a sea wall having a double row of sheeting piles, the interval filled in with rubble or *béton*. The latter is excellent. The term jetty is also applied to expensive and solid erections of masonry, and to hards or landing places for boats.

Telford's jetty, B, at the eastern arm of Kingstown harbor, Ireland, is an example of a jetty made of rubble, with a track and parapet of coursed masonry. The foreshore, in most works of this kind, is faced with patched stones, that is, an outer layer in which the undressed stones are not laid at random, but deposited end on, beginning at the lower edge, and so caused to bind and become mutually sustaining

Jetties of masonry, C, have usually ashlar facings and heartings of rubble or concrete. The walls filled in with *béton* will be nearly equal to a solid mass; in fact, *béton* it self makes a wall of such tenacity that its strength is equal to a homogeneous block. When the ashlar masonry is filled in with earth, it requires a bond; when this is masonry, the counterforts take the form of division walls, which thus reduce the jetty to a series of compartments. The stones of these horizontal bonding courses should be cramped and joggled together, and the top carefully paved to prevent infiltration.

The southern jetty, D, of the port of Havre is exposed to violent storms and a powerful littoral current. It exemplifies the ashlar facing, horizontal bonding walls, rubble filling, paving, parapets, aprons of piles and *pierre-perdue* to protect the foundations from the repercussion of the waves, all executed in a style which has provoked the admiration of those who have understandingly examined it.

FELTING.

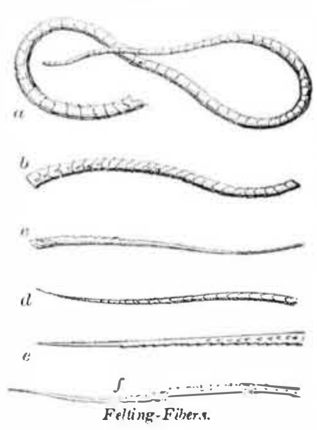
The mechanical features of the operation of felting are derived from the jagged character of the edges of some animal fibers which enables them to pass in one direction, that is, root first, but opposes their withdrawal. When the fibers are pressed together by suitable means, the projections interlock, and a compact fabric is produced.

In Fig. 4 are represented several

FELTING FIBERS

as seen under the microscope. *a* is a fiber of Saxony wool, somewhat less than $\frac{1}{1000}$ of an inch in diameter. *f* is rabbit hair, and *b* beaver down, which has a diameter of about $\frac{1}{2000}$ of an inch. *c*, *d*, and *e* are muskrat, nutria, and hare fur. They all show the jagged edges which confer upon them the characteristic felting quality.

Fig. 4.



Felting-Fibers.

M. Du Chaillu, the well known African explorer, describes a

PRIMITIVE EASY CHAIR,

devised by Obindji, a chieftain of a tribe living in the Gaboon country. This dusky potentate is represented, enjoying a *siesta* in the offspring of his inventive genius, in Fig. 5. The chair is nothing more than a slab of wood which

Fig. 5.

Obindji in his Easy-Chair; Gaboon, Africa. A. D. 187?.

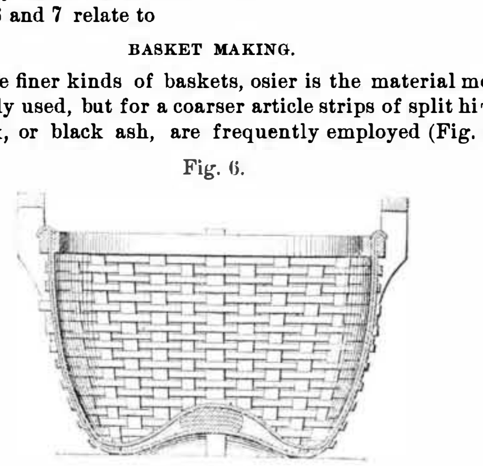
rests on an inclined four-legged frame, and is held from sliding by blocks at its lower end.

Figs. 6 and 7 relate to

BASKET MAKING.

For the finer kinds of baskets, osier is the material most commonly used, but for a coarser article strips of split hickory, oak, or black ash, are frequently employed (Fig. 6.)

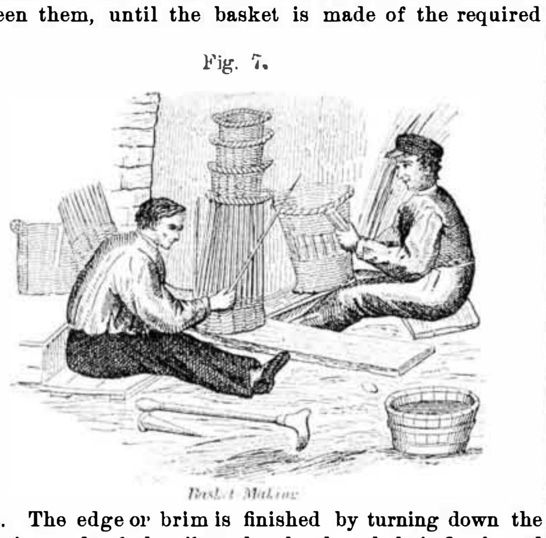
Fig. 6.



Splint Basket.

Osiers are prepared by soaking in water, after which they are split, cleaned, and bleached in the sun. A number of rows are laid crosswise to begin the bottom of the basket, and are woven together by a spiral weft of wands, which pass alternately over and under the radial wands, to which others are added as the size increases. The wands are bent up to form the sides, and other rods are woven in and out between them, until the basket is made of the required

Fig. 7.



Basket Making.

hight. The edge or brim is finished by turning down the projecting ends of the ribs, whereby the whole is firmly and compactly united. Handles are formed by forcing two or three osiers, sharpened at the ends and cut to the proper length, down the weaving of the sides and close together. They are pinned fast near the edge and afterwards bound or plaited.

Hydrophobia and Intemperance.

Mr. L. N. Noyes, of Boston, Mass., sends us the following, from the Brooklyn *Argus*:

"Hydrophobia, in the dog, I am satisfied, is the result of the animal having been inoculated by biting some person suffering from the disease of intoxication. Startling as this theory may appear, there is not the least question but that the facts will bear it out. First, hydrophobia and *mania a potu* are identical in most physical conditions—subjects dead of either disease presenting nearly the same autopsy. Second, the saliva of a man dying of delirium tremens, and that of a dog suffering from rabies, bear the same chemical analysis. Third, the entire system of the patient suffering from alcoholic madness is so poisoned that rapid inoculation will follow any contact with the virus of the blood. Fourth, the bite of a man in an alcoholic fit has been known to result in hydrophobia. As to the application of these facts: First, with the canine race, hydrophobia is never spontaneous; with man, the disease is known to be. Second, there is not a case on record of a dog having died of hydrophobia that will not admit of proof—if the facts can be ascertained—that the dog had previously bitten an intoxicated person, or had been attacked by some other animal suffering from a like inoculation.

GEORGE WILL. JOHNSTON, Superintendent Brooklyn Society for Prevention of Cruelty to Animals."

We think the statements here made are without foundation: In regard to the first assertion, that hydrophobia and *mania a potu* are identical, by which we presume the writer means that similar symptoms are developed in both, we would refer him to the works of the best authorities, in which he will find that they differ in the most important respects. That the autopsy in both cases is similar is quite natural, since there are no well marked anatomical lesions in either; nor are there in hydrocyanic acid poisoning, *tetanus*, etc. Secondly, as to the saliva of a man dying of *delirium tremens*, etc.: we do not fully understand what the writer means. If it is that the same abnormal principles are found in the saliva of both cases, such as would produce hydrophobia if introduced into the healthy circulation, we can only reply that this could only be proved by a number of experiments, which have not, as far as we are aware, ever been made. We almost daily hear of cases where a nose, an ear, a cheek, or a finger is bitten off in a drunken broil, without hydrophobia resulting. Thirdly, there is no virus of the blood in alcoholism. According to Flint, Sr., Minuyer, Watson, Reynolds, Dunglison, and many others, the etiology of hydrophobia is not known; while it never appears in the human subject without inoculation in the correct sense of the word, and not as Mr. Johnston uses it. The last deduction is too absurd to demand attention.

Correspondence.

The Centennial Trial of Steam Fire Engines.

To the Editor of the Scientific American

Will you please correct an error in your otherwise admirable account of the trial of steam fire engines at the Centennial?

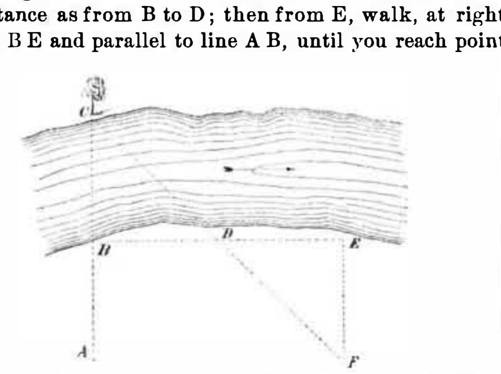
The judges were assisted by Mr. Wellington Lee, as expert, not by a Mr. Wellington as you printed it. Mr. Lee is well known as a member of the firm of Lee & Larned, who, after Latta of Cincinnati, were the pioneers in steam fire engines, and first made them an established success. He is on all accounts the most competent man living to fill the exceedingly difficult position of expert assistant to the judges.

Newark, N. J. CHARLES T. PORTER.

To Measure the Width of a River.

To the Editor of the Scientific American:

Let A B represent the line of survey (the course being at any point of the compass), striking the river bank at B. Mark a tree or bush on the opposite bank, in line with A B. Then lay off 25, 40, 50, or any number of feet from B to D, at right angles with the line A B: from D to E lay off the same distance as from B to D; then from E, walk, at right angles to B E and parallel to line A B, until you reach point



F, which is in line with points C and D. Then measure from E to F, which will be the same distance as from B to C, or the width of the stream. A. S. LEHMAN.

Fort Cameron, Utah Ter.

[For the Scientific American.]

A LESSON FROM THE MACHINE TOOLS AT THE CENTENNIAL.

It is somewhat remarkable that, while the exhibits in Machinery Hall show the advancement in special manufactures and processes, yet, in the tools and appliances for producing the machinery, but little progress seems to have been made during the last thirty years. If we examine the loom, the printing press, and the woodworking machinery, our advance is marked by complete and successful applications of new and original principles. But if we turn to the lathe and the planing, drilling and slotting machines, in fact to any of the tools used in the construction of machines, we shall find that we have reach a platform where we may "rest and be thankful," but beyond which we have apparently but a small prospect of further progress. If we examine the lathe, and ask ourselves in what broad particular we have improved upon the old Smith, Beacock, and Tannett lathe of thirty or forty years ago, we shall not readily find an answer. We have the same bed, the same cone mandril, the same gear, screw-cutting, and independent feeds, the same cross feed, the same compound rest, the same tail stock, in fact, the same design and general arrangement all through; and with the exception of the introduction of the universal chuck, our chucking devices are identical. If we turn to the lathe cutting tools, we shall find that our practice has been stationary. In planing machines, we have adhered to a like general arrangement of parts: and the departures from old practice are not worth mention. The slight modifications consist in arrangements for a quick return motion by means of an extra pulley and belt instead of differential gearing, and in the application of an independent rest attached to the uprights for planing vertical faces. In planing machine cutting tools, we have made no innovation; and the only departure from the old time practice has been in the modern plan of taking a finishing cut on cast iron with a broad, flat-nosed tool with a very coarse lateral tool feed. In shaping machines, we have made some departures in the entire design, giving to one machine capacity for a much wider range of work. The sliding head has been made movable upon the bed, and various attachments for the table have been introduced. But the machines built by Maclear and March, a generation since, had a quick return motion, cone mandrils for circular work, and a vise chuck (as good as any we remember to have seen, except that lately introduced by Thomas & Co., of this city); whereas we do not know of a modern shaping machine equal in capacity to the Nasmyth "puff and dart" machine of thirty years ago. That machine, which is still extensively used in England upon the edges of armor plates, had a stroke of five inches and made 160 cutting strokes per minute. Referring again to the various attachments for the table, but very few of them are used for general work. In cutting tools for shaping machines, we have no modern innovations whatever. In drilling machines, our progress has been confined to the introduction of multiple machines, adapted to special work, and in various forms of radial drilling machines, constituting a more marked improvement than in the machines above mentioned; but in the drilling machine pure and simple we have made no substantial progress, except it be in the introduction of the twist drill, which is decidedly a step forward in drilling fine work. The Maclear and March drilling machines above mentioned were as substantial in their framing, and were provided with self-acting change feed as well as hand feed; for light work a treadle feed was employed, leaving both hands free to manipulate the work. In screwing machines, we may justly lay claim to advancement in the introduction of solid dies, and in the use now common of segmental dies fitted to adjustable chucks; so that, while the dies cut the whole thread at one cut, they thus avoid the strain on the sides of the thread, which is inherent in those dies which are adjustable and require to take more than one cut to make a full thread. Another modern improvement is in the dies, which are made to throw open when the thread to be cut is finished, so that the dies do not require to travel back over the thread, a movement which abrades the cutting edges of the die teeth, and also entails a loss of time. We have also added pumps for supplying a more copious stream of oil to the dies; so that, taken altogether, we have made satisfactory progress, notwithstanding that the tap has maintained its original form, except it be in our having adopted a standard angle and pitch.

Our greatest degree of progress has been in the milling machine, which has been given a very wide range of useful application during the last thirty years. But milling machines and milling cutters, of the same shape as those at present used, and with self-acting feeds, were employed years ago; but their field of employment was then comparatively limited. In the slotting machine, we know of no substantial improvement made during the last twenty-five years, and but little indeed in a much longer period. The slotter introduced by Sharp, Stewart, and Co., of Manchester, England, about the year 1855, had a box frame, and as complete an arrangement of change speeds and table movements as any exhibited at the Centennial. In boring machines, we have made considerable improvement, especially in the introduction of those of the horizontal type.

In none of these machines, however, have we succeeded in attaining higher rates of cutting speed and feed than were formerly used. It is only when we turn to special machines that the march of modern progress becomes visible. The Monitor lathe, for example, will produce infinitely more small work than was formerly attainable by any machine worked by one operative. It is, however, scarcely just to term it a lathe, since it is more properly a special machine having definite limits of useful application. The introduction of solid emery wheels is another modern improvement, greatly facilitating our operations upon hard metals requiring to be very true, but in no way advancing us in the practice of polishing, for which purpose the wooden wheel, covered with leather and coated with emery, still holds its own. So likewise for many purposes the quick running grindstone has not been displaced by the emery wheel. In polishing processes our progress has been but little, the greatest innovation being in the employment of rag wheels.

In many of our special machines, we have merely enabled the ordinary mechanic to produce as much and as good work as the most expert workman did formerly: and we have lowered the standard of capability of our mechanics in a proportionate degree. This, however, is not in the main to be regretted, since, having the improved machines, we do not as a rule require the expert workmen. The only attendant evil lies in that, though we have greatly enhanced our ability to produce new machines, we have in a partial degree produced a less skillful class of workmen to repair them. It is true that worn out parts may be duplicated, but that is not sufficient, for the reason that the new part is of the original size, whereas the repaired part requires in a majority of cases to be made sufficiently larger to compensate for the wear in the part to which it is attached. Thus, if a hole is