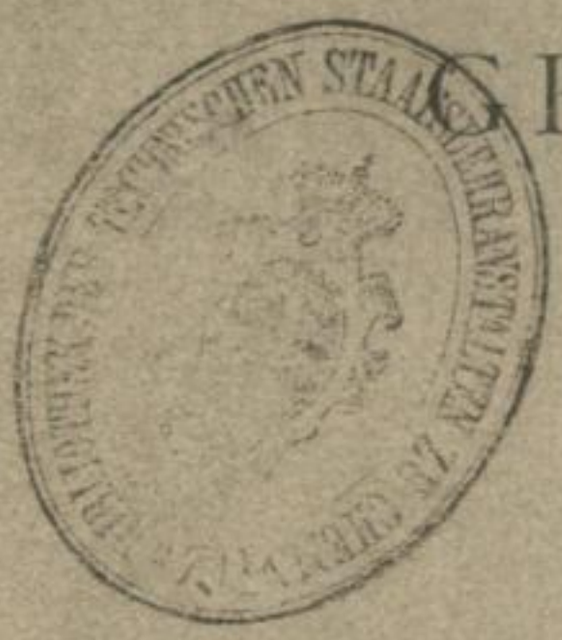
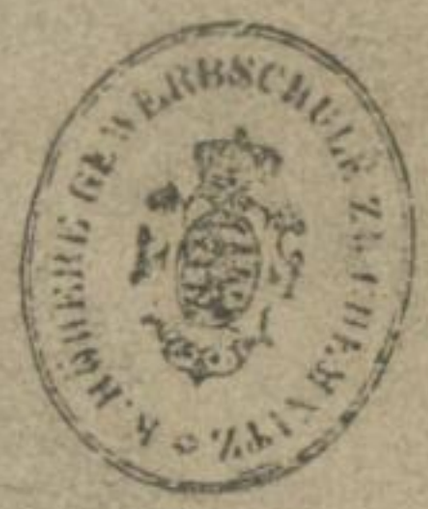
United States Centennial Commission.

INTERNATIONAL EXHIBITION, 1876.

REPORTS AND AWARDS

GROUP XV.





EDITED BY

FRANCIS A. WALKER,

CHIEF OF THE BUREAU OF AWARDS.

PHILADELPHIA:

J. B. LIPPINCOTT & CO.

1877.

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SYSTEM OF AWARDS

[*Extract from Circular of April* 8, 1876.]

Awards shall be based upon written reports attested by the signatures of their authors.

The Judges will be selected for their known qualifications and character, and will be experts in departments to which they will be respectively assigned. The foreign members of this body will be appointed by the Commission of each country and in conformity with the distribution and allotment to each, which will be hereafter announced. The Judges from the United States will be appointed by the Centennial Commission.

* * * * * * * * * * *

Reports and awards shall be based upon inherent and comparative merit. The elements of merit shall be held to include considerations relating to originality, invention, discovery, utility, quality, skill, workmanship, fitness for the purposes intended, adaptation to public wants, economy and cost.

Each report will be delivered to the Centennial Commission as soon as completed, for final award and publication.

Awards will be finally decreed by the United States Centennial Commission, in compliance with the Act of Congress, and will consist of a diploma with a uniform Bronze Medal, and a special report of the Judges on the subject of the Award.

Each exhibitor will have the right to produce and publish the report awarded to him, but the United States Centennial Commission reserves the right to publish and dispose of all reports in the manner it thinks best for public information, and also to embody and distribute the reports as records of the Exhibition.

ORGANIZATION AND DUTIES OF THE JUDGES.

[*Extract from Circular of May* 1, 1876.]

Two hundred and fifty Judges have been appointed to make such reports, one-half of whom are foreigners and one-half citizens of the United States. They have been selected for their known qualifications and character, and are presumed to be experts in the Groups to which they have been respect ively assigned. The foreign members of this body have been appointed

by the Commission of each country, in conformity with the distribution and allotment to each, adopted by the United States Centennial Commission. The Judges from the United States have been appointed by the Centennial Commission.

To facilitate the examination by the Judges of the articles exhibited, they have been classified in Groups. To each of these Groups a competent number of Judges (Foreign and American) has been assigned by the United States Centennial Commission. Besides these, certain objects in the Departments of Agriculture and Horticulture, which will form temporary exhibitions, have been arranged in special Groups, and Judges will be assigned to them hereafter.

The Judges will meet for organization on May 24, at 12 M., at the Judges' Pavilion. They will enter upon the work of examination with as little delay as practicable, and will recommend awards without regard to the nationality of the exhibitor.

The Judges assigned to each Group will choose from among themselves a Chairman and a Secretary. They must keep regular minutes of their proceedings. Reports recommending awards shall be made and signed by a Judge in each Group, stating the grounds of the proposed award, and such reports shall be accepted, and the acceptance signed, by a majority of the Judges in such Group.

The reports of the Judges recommending awards based on the standards of merit referred to in the foregoing System of Awards, must be returned to the Chief of the Bureau of Awards not later than July 31, to be transmitted by him to the Centennial Commission.

Awards will be finally decreed by the United States Centennial Commission, in compliance with the Act of Congress of June 1, 1872, and will consist of a special report of the Judges on the subject of the Award, together with a Diploma and a uniform Bronze Medal.

Upon matters not submitted for competitive trial, and upon such others as may be named by the Commission, the Judges will prepare reports showing the progress made during the past hundred years.

Vacancies in the corps of Judges will be filled by the authority which made the original appointment.

No exhibitor can be a Judge in the Group in which he exhibits.

An exhibitor, who is not the manufacturer or producer of the article exhibited, shall not be entitled to an award.

The Chief of the Bureau of Awards will be the representative of the United States Centennial Commission in its relations to the Judges. Upon request, he will decide all questions which may arise during their proceedings in regard to the interpretation and application of the rules adopted by the Commission relating to awards, subject to an appeal to the Commission.

A. T. GOSHORN,
Director-General.

[*Extract from Director-General's Address to Judges, May* 24, 1876.]

"The method of initiating awards which we have adopted differs in some respects from that pursued in previous exhibitions. In place of the anonymous verdict of a jury, we have substituted the written opinion of a Judge. On this basis awards will carry the weight and guarantees due to individual personal character, ability, and attainments, and to this extent their reliability and value will be increased. It is not expected that you will shower awards indiscriminately upon the products in this vast collection. You may possibly find a large proportion in no way raised above the dead level, nor deserving of particular notice. The standard above which particular merit worthy of distinction begins is for you to determine. In this regard I have only to express the desire of the Centennial Commission, that you should do this with absolute freedom, and when you meet with a product which you consider worthy of an award, we desire you to say, in as few words as you may deem suitable, why you think so.

"This, gentlemen, is all we ask of you in the Departments of Awards. Opinions thus expressed will indicate the inherent and comparative merits, qualities, and adaptations of the products,—information which the public most desires.

"Elaborate general reports and voluminous essays, though of great value as sources of general information, give little aid in determining the reliable or intrinsic merits of particular, individual products.

"The regulations which have been published divide the work of awards into three parts:

"1st. The individual work of the Judges.

"2d. The collective work of the groups of Judges.

"3d. The final decisions of the United States Centennial Commission in conformity with the acts of Congress.

"Each award will thus pass three ordeals, which, doubtless, will be ample and satisfactory."

GROUP XV.

JUDGES.

AMERICAN.	FOREIGN.
DANIEL STEINMETZ, Philadelphia, Pa.	J. BAIN, Lord Provost of Glasgow, Great Britain.
CHAS. STAPLES, JR., Portland, Me.	DAVID MCHARDY, Great Britain.
GEORGE L. REED, Clearfield, Pa.	JULIUS DIEFENBACH, Germany.
JOHN D. IMBODEN, Richmond, Va.	

GROUP XV.

BUILDERS' HARDWARE, EDGE TOOLS, CUTLERY, ETC.

1. CLASS 280.—Hand tools and instruments used by carpenters, joiners, and for wood and stone in general. Miscellaneous hand tools used in industries, such as jewelers', engravers'.

2. CLASS 281.—Cutlery—knives, penknives, scissors, razors, razor-strops, skates, and implements sold by cutlers.

3. CLASS 283.—Metal hollow-ware—ornamental castings.

4. CLASS 284.—Hardware used in construction, exclusive of tools and implements,—spikes, nails, screws, tacks, bolts, locks, latches, hinges, pulleys. Furniture fittings; ships' hardware. (For carriage hardware, see Group XVII.)

5. Horseshoes and horseshoe nails.

6. Malleable iron castings.

7. Stove polish.

GENERAL REPORT

OF THE

JUDGES OF GROUP XV.

INTERNATIONAL EXHIBITION,
Philadelphia, 1876.

PROF. FRANCIS A. WALKER, *Chief of Bureau of Awards:*

SIR,—I have the honor to transmit herewith the report of the Judges of Group XV., which I trust will prove satisfactory.

Very respectfully,

DANIEL STEINMETZ, *Chairman.*

GROUP XV.

BUILDERS' HARDWARE EDGE-TOOLS, CUTLERY, ETC.

SAFES, SAFE-LOCKS, ETC.

BY DANIEL STEINMETZ.

This exhibit comprised a very important interest, and presented a very extensive and creditable display, having in all twenty-five depositors, of whom nine were foreign.

Between the foreign and domestic manufactures there is a marked contrast. While the foreign products are in some instances exceedingly well fitted, and finished in a workmanlike manner, there is but little manifestation of an intention to give protection from intense heat, or from the ingenuity of an accomplished burglar—qualities so largely prominent in the domestic products. It may be, and doubtless is, to a considerable extent, the case that the opportunities are not so frequently supplied, in the densely-populated cities and towns of the Old World, either for extensive fires or for long-continued burglarious operations as are found in this country, and therefore the same extent of protection in these particulars is not needed, but it is quite certain that, with our views and experience, great change would have to be made to adapt the foreign safes to popular use in this country.

In American safes the greatest care has been taken to thoroughly protect by the use of every known effective non-conductor as a safeguard from intense heat, and also by the adoption of layers of steel and iron and other hard material, either riveted and welded together in almost every conceivable manner or dependent upon its native strength alone, made in various forms of depository, to secure from the attacks of burglars.

Generally, what appears to be a large receptacle will be found to

be so supplied by layers of metal, deposits of "fire-proof" material, patent locks, bolts and bars, as to have but a comparatively small interior space in which to deposit the articles to be secured.

As it is generally the case, however, that articles deposited in safes are valuable, and require but little room, this occupation of space is not deemed objectionable where safety is secured, but if a larger space is desired it is provided in a safe of larger size, which can be obtained at a proportionate advance in price.

Very great ingenuity has been shown in the invention of locks, prominent among which appears what is called the "chronometric" or time lock. Acting automatically, it prevents the opening of the safe between given hours, when the director desires it to be closed, thus positively preventing the opening of the safe by any one, even though in possession of every detail of the mechanism of both lock and safe. The hour predetermined for opening must arrive, when the chronometric attachment removes the obstruction, and then only can the safe be unlocked. This attachment is made in the interior of the safe, and therefore cannot be controlled except by force, which, of course, could not be applied if proper protection was given. This provision affords protection to country banks and bankers, whose cashiers are liable to be attacked by burglars, taken to the bank, and compelled to open the vaults or supply the means to do so. As, when the chronometric attachment is used, the custodian of the safe cannot open it out of hours for any purpose, the burglar must either do what he can to break in or wait for the time for unlocking, which would probably be quite an unsafe hour for him.

The safes now made are not only up to the improvements of the intelligence of the hour in point of substantial service, but are even elegant in their finish and ornamentation. Some are so combined with the patterns and designs of household furniture as to make them beautiful and attractive in the parlor or drawing-room, at a cost not unreasonably above articles of good quality made by the cabinet-maker for ordinary service.

The bankers' or business safes are, however, of the greatest importance to the welfare of the community. In these the increasing dexterity of the burglar, armed with the most improved drills, wedges, and levers, and supplied with air-pump, blow-pipe, and concentrated explosives, has kept active all the inventive powers at the command of safe-makers. So we have constantly contending the burglar and the safe-maker,—the first aiming to prey upon the community, the other to defeat this aim. Thus, as burglars apply improved tools and materials to open the locks or penetrate the walls

of the safe, the safe-maker must stand prepared to supply a preventive by increasing the resistive power of his safes.

Viewing the best American safes, with their massive casework, heavy bolts, and ingenious lock-construction, we find a wonderful contrast with the American safe of fifty years ago.

What was then called a safe was little more than a box with a hollow frame of heavy sheet-iron, between the outer and inner walls of which was deposited either (so-called) asbestos, plaster, or some other preparation deemed sufficient for protection in an ordinary fire. It was commonly made with corner- and edge-bands, which were riveted with ordinary rivets, and the whole outer surface of the safe, except the bottom, laid at regular intervals with cast-iron knobs, to add to the appearance of weight and strength. The locks were of the plainest character; and it is believed an expert burglar of the present day could enter them with very ordinary tools in a very few minutes. One of these "safes" is occasionally brought to light at public sale, where they are so little esteemed for their powers of protection as to make their price not greatly above that of a wooden box of similar dimensions.

Urgent solicitations were made that experimental tests should be had whereby the power of resistance to fire and burglars might be established. Inasmuch as no provision was made to this end by the Commission, and as all such tests give rise to charges of unfairness, and are seldom, if ever, satisfactory to any of the parties interested, it was determined to make none, and to confine the investigation to the merits of each deposit as it appeared in the Exhibition.

EDGE-TOOLS, CUTLERY, POLISHING AND BURNISHING MATERIALS, METAL HOLLOW WARE AND ORNAMENTAL CASTINGS, AND HARDWARE.

BY DAVID McHARDY.

(Extract from the Report to the British Commission.)

The following table shows the number of the exhibitors in the different classes of Group XV. to which this report refers. As might be expected, the United States are by far the best represented country. Then comes France, between which and the United States there have been for the last hundred years many friendly associations. Canada and Great Britain and Sweden are the best represented of the remaining countries.

	Edge-Tools used by Carpenters, Joiners, etc.; Miscellaneous Hand-Tools.	Cutlery, Knives, Scissors, Razors, Skates, and Implements sold by Cutlers.	Emery and Sand-Paper, Polishing Powders, Burnishing Tools, etc.	Hollow Ware and Ornamental Castings, etc.	Metallic Products.	Burglar and Fireproof Safes, Safe Locks, etc.
Classes	280	281	282	283	284	284
United States	70	34	3	14	9	13
Great Britain	5	7	.....	1	4	1
Canada	23	4	.....	.....	4	1
France	7	13	5	12	1	1
Germany	2	4	1	3	1	.....
Austria	3	1	.....	2	1	.....
Switzerland	5	1	.....	.....	1	.....
Belgium	1	.....	.....	.....	4	1
Netherlands	1	1	.....	.....	1	.....
Sweden	6	5	.....	.....	.....	1
Norway	.....	1	.....	2	2	2
Italy	1	1	1	3	2	.....
	124	72	10	37	30	20
Total	293					

CLASS 280.—Edge-Tools and Miscellaneous Hand-Tools.

It will be seen from the table that more than half of the exhibitors belong to the United States.

The natural advantages which America possesses in the products of her mines place her in a better position to obtain a high quality in the materials out of which the greater part of the exhibits in this class are made, than is to be found in most of the other countries which were represented at Philadelphia. The remarkably fine quality of the iron ore, the care taken in its reduction, and the skill displayed in the manufacture, both of iron and steel, by American firms, result in their productions' occupying an enviable position before the world.

Axes.—Among edge-tools a front place must be given to the axe. There are few countries where the axe has been so much employed or more severely tested than in the United States. The clearing of the forests from so wide an area must have shown to the settlers very correctly not only what was required in the quality of the axe, but what was the best form in which it should be made.

The American axe has for many years displaced the axes imported from Britain, and these axes are now used exclusively throughout the

United States, and in other countries, including Canada, where their excellence has stimulated several Canadian firms to manufacture for themselves axes of a similar character. American axes are now imported into this country, and are found, for the purpose of clearing land, more efficient than the tools made in the old shape at home. The great proportion of the American axes are manufactured by welding in the steel into the axe after the eye has been partially formed. This mode requires very careful attention and skill, to prevent the steel from being injured in its quality; but the best American axe is made out of a solid piece of cast-steel, and the eye is punched out of the solid. These axes are superior, as the steel is not by this plan injured in welding; but there is no difference in the shape of the tool.

In the original form of the British axe the section would show the eye to be the thickest part of the tool, tapering slightly towards the crown; below the eye the body of the axe is thinned considerably, tapering down to the cutting edge. In the American axe, the body is slightly tapered to the crown, and from the eye the body of the axe is kept full and tapered down to the cutting edge.

In felling trees the American axe is more easily worked; its shape enables it to be more easily drawn out after the blow is given, and the body of the axe, being much firmer, is not liable to twist in working. American axes made by welding in the steel had their cutting quality severely tested by striking a steel block several times without turning the edge. The demand for this class of axes is enormous, and the number of makers consequently very large, so that we are not surprised to find many exhibitors of the same style of tool with little difference in the external appearance. In most cases the exhibits (which were taken from stock) were polished in a superior manner, and some of them were fitted with handles, so that an opportunity was afforded of putting their quality to the test as explained above.

Among the more extensive exhibitors were Messrs. Collins & Co., *New York, N. Y.*, whose display was one of the largest and most complete in the section of edge-tools. It comprised most of the varieties and qualities that are in use, all of excellent workmanship. They exhibited, also, a number of picks, from five to seven pounds, for mining purposes, with adze-eyes, polished and plain.

The Douglas Axe Company, *Boston, Massachusetts*, also showed a large assortment of axes, hatchets, and adzes, with patent eyes; also, picks for railway purposes, of the same variety as the exhibit of Messrs. Collins, and good specimens of workmanship.

YERKES & PLUMB, *Philadelphia, Pennsylvania*, exhibited a select variety of adzes, cast-steel hammers for machinists and engineers, smiths' hammers, hand and fore hammers, and heavy picks with strong eye for general use. They are all of a high class, the shape having been carefully arrived at, and the manufacture excellent.

PICKAXES, ETC.—The HARDY PATENT PICK COMPANY, LIMITED, *Sheffield, England*, exhibited a large number of cast-steel picks, specially made for mining operations; the picks are made of an extra fine quality of cast-steel. The specialty of the pick consists in the mode by which any number of picks can be fitted to one handle.

DATES PATENT STEEL COMPANY, *Toronto, Canada*, exhibited a large variety of tools for different industries, viz., cast-steel drawing-knives of different varieties, cast-steel adzes for the carpenter and the cooper trade, lath-splitting axes for plasterers, double-ended axes or mattocks for clearing roots, and axes for forest use of the American pattern. The company make their own steel, and use petroleum in the process.

JOSEPH WARNOCK & Co., *Galt, Ontario*, exhibited cast-steel axes, the axes being forged entirely from cast-steel, and the eye of the axes punched out of the solid bar, as already described. In addition to a variety of axes of this description, the company manufacture a large assortment of coopers' tools, adzes, drawing-knives, all of excellent workmanship. The two exhibitors last mentioned were both considered worthy of a silver medal granted by the Canadian Commission to exhibitors from the Dominion.

An assortment of strong lumbermen's tools was exhibited by PETER ROBERTSON, *Ottawa, Ontario*. They consist of long ash handles, about six feet, with strong hoops at the lower end, which are further strengthened by iron sockets and sharp points. At some distance from the point an eye with a long hook is firmly fixed through the handle, and this is used for canting the trees. There are a number of these required, and the exhibit shows how carefully they have been made. A number of dogs and rings, and other fixings and shackles for rafts, are of the same quality, and well suited for the description of work. The exhibit also contained a number of cast-steel chisels and puncheons for working granite, short picks with handles, and single axes for the same description of work. The specimen of smith-work was good. The chisels and puncheons are of $\frac{7}{8}$-inch octagon cast-steel, and 7 inches long. The picks are made from a good quality of iron, $2\frac{1}{4}$ inches square at the eye, and

tapered to a sharp point; the steel is of the best blister or hoop L quality, and is frequently renewed.

THOMAS MOORE, *Cooksville, Ontario*, exhibited a large assortment of tool-handles, made of clean ash, both round and oval; they are beautifully turned and finished for the several forms required, viz., axes, hammers of different sizes, steel forks, shovels, etc. The wood is of the lightest description, and in shovels, forks, or instruments for farm or laboring use must be of considerable advantage in lessening the weight of the tool.

The Dominion bronze medal was awarded by the Canadian Commissioners to P. Robertson and Thomas Moore.

The D. R. BARTON TOOL COMPANY, *Rochester, New York*, exhibited a fine display of cast-steel hammers, with handles, for carpenters, joiners, and for general use. They are made with adze-eye sockets for the handles, and well-formed claws clean cut inside. A variety of carpenters' and joiners' chisels and other tools for that trade are of excellent workmanship.

GEORGE SELSOR & CO., *Philadelphia, Pennsylvania*, exhibited a varied assortment of hammers, edge and railroad tools of good workmanship, and in addition a coffee-mill of a new construction, which the patentee calls the "Treble Anti-friction Coffee-Mill." The barrel is formed into two flat cones, the upper is cut rough, and the lower cut with a finer pitch to suit any degree of fineness required. The case inclosing the barrel is of iron, in two parts, the cutting inside both being of the same pitch as the barrel which is inclosed. The spindle rests on a steel stud in the centre of the lower case, and prevents any friction in regulating the fineness of the coffee. This is done by a screw on the top of the spindle. The specialty consists in being able to regulate the degree of fineness when the mill is in motion. All the cutting parts are hardened, and the patentee states that it grinds "as fine as the best French mills and with much greater rapidity." This was tried for different degrees of fineness, and the results were very satisfactory in reference to the time employed and the quality of the grinding. A suitable mill for a family, with polished poplar box 7¾ inches square, and Britannia hopper, costs, in Philadelphia, $1.25.

Although only a few exhibitors have been referred to above it will be understood that the number in the class was very large, and that it was with the greatest difficulty that any difference in the quality of the articles displayed could be discovered.

SAWS.—If the axe occupies an important position in usefulness, undoubtedly the saw cannot be considered as a less important tool

in the workshops of a civilized country. The hand-saw has for ages been constructed on two types,—first, the broad flat saw with a handle at the end, as used in Britain; and, second, a thin steel band stretched from two points, such as is used by Frenchmen and Chinese. In America both kinds are used, each kind being employed in the class of work to which it is naturally best suited. In the ordinary workshops the circular and the band saw are now used extensively and cause immense saving in time and labor by the manner in which curved work is so quickly executed.

The most extensive exhibit of saws was by MESSRS. HENRY DISSTON & SONS, *Philadelphia, Pennsylvania*, consisting of every variety, from the large circular saws for machinery to the smallest band saw of ⅛ inch in breadth. Some of the largest circular saws have separate steel teeth inserted in the circumference, so fitted that the friction in the operation does not loosen their hold or destroy their efficiency. The handsaws were carefully examined, not only for hardness of the steel but for the quality of the temper. Several handsaws were tried by striking their backs upon a bloom of cast-steel without marking them in the least degree, and the same saws were bent until the point touched the wooden handle, and when let free sprang back to their former shape, perfectly straight.

Disston & Sons have made improvements in the form of the handles, and in the mode of fixing them to the saw; there is also an improvement in the shape of the blade, by which it is made lighter and more convenient by giving it a greater taper to the point. The smaller saws with brass and iron backs were of excellent workmanship. In addition to the different varieties of saws they exhibited an assortment of steel squares and rules, correctly graduated, and marked by figures beautifully finished; also an assortment of levels for workmen, with finished stocks. This firm is one of the largest in America; they employ 1200 hands, and manufacture their articles from Sheffield steel, using up all their waste cuttings.

It is creditable to the Dominion of Canada to have such a firm as that of MESSRS. R. H. SMITH & CO., *St. Catherine, Ontario*, representing the growing manufactures of the Province. Their case contained (besides the large circular saws for machinery) a great display of all descriptions of cast-steel saws, frame saws, hand and tenon saws, and a variety of the smaller sizes of carpenters' tools. The steel used by this firm is stated to be Jessop's. The quality of the tools is excellent, and the workmanship superior. This firm obtained the gold medal of the Canadian Commission for the great extent and high quality of their exhibit.

The AMERICAN SAW COMPANY, *Trenton, New Jersey*, exhibited an extensive assortment of machine and handsaws; the latter showed great excellence in the manufacture by the elasticity and the workmanship of the tools.

MR. EBEN MOODY BOYNTON, *New York*, exhibited a good selection of saws of cross-cut and other varieties of considerable extent; they are made out of the best cast-steel, and well finished; also ice and dray saws. The specialty of this exhibit was a cross cut saw, which is named "the Patent Lightning Saw," from its performances. Its novelty is in the shape of the teeth, which are different from those of an ordinary cross-cut saw. By the form of the teeth the saw can cut both by the forward and backward motion. An experiment was made in the presence of two officials of the effect of this form of teeth, when two men cut through a 16-inch log in 17 seconds. This firm also showed a new form of pruning-saws with cutting-teeth on both edges; they are made from 14 to 22 inches long, and are said to be much more convenient than the common form.

MR. ANDREWS, *of Williamsport, Pennsylvania*, is the maker of a flat handsaw, which has the handle considerably strengthened by the simple means of allowing the steel of the saw to pass right to the end as a flitch between the wooden pieces of the handle, to which it is firmly riveted. The same maker has also a simple and clever saw frame, by which the saw is kept always properly strained without the means of a brace.

The exhibitors in this class of goods were chiefly from the United States; Great Britain had not a single representative, although for years Sheffield supplied not only our own country but nearly all the world. It will be seen from what has been already described that this monopoly remains with us no longer, and it is to be hoped that the knowledge of this fact will rouse up the manufacturers in England to try and achieve, as far as may be possible in the present circumstances, a position of equal distinction to that held by their predecessors.

AUGERS, ETC.—In remarking upon tools generally employed in the manufacture of wood, it will be necessary to notice the class used in the heavier branches of the building trade and those that are required in the workshops of joiners, carpenters, cabinet-makers, turners, carvers, and by amateurs and others. In this section the auger, on account of its many uses in the arts, may be considered the most important exhibit. The grand display of examples and the number of exhibitors bore testimony to this fact. The exhibits, as we have

noticed in other classes, are for the most part manufactured in the United States, the number from other countries being very limited.

Great improvements in the qualities of augers have been made during recent years, as shown in the many varieties now in general use. The old shell auger is very rarely employed, and the screwed form of the tool has taken its place. The augers exhibited at Philadelphia were remarkable for the accuracy of the twist, the various forms of the cutters, the quality of the steel, and the fine finish of the twist and polish, all showing a degree of perfection not previously reached. An opportunity was afforded of testing the quality of two varieties, in boring a piece of pine and a piece of walnut by an auger with Jenning's patent bit, and one with a gouge-lip bit, both of 14.16 diameter. The result was nearly the same in the cross boring, but in the end wood, specially of the pine, it was agreed, after a fair trial, that the gouge bit made the cleanest hole.

A class of augers was shown different in the form of the screw, and named "Single Twist Bits," but they are more expensive and not so generally used as others.

The number of turns of screw varied. In the augers which were tested the screw did not exceed 6 turns. Smaller sizes have from 6 to 8 turns, while a variety called car bits, used principally by coach-builders, have the twist extended to 16 turns. These car bits are more expensive than the common gouge-lip bit of the same diameter. A very fine exhibit of them was shown in the Machinery Hall at the back of Messrs. Disstons' display.

There was a limited show of augers named "Tap Borers," different in shape from any of the other forms, and used in making wooden pipes. They are made hollow, of steel, and fixed to an iron socket-head for the handle, and have a long taper with screw point. The width at the shoulder, where the iron socket is attached, measures from 6 to 8 quarters of an inch.

For boring large-sized holes, an instrument named the "Expansive Boring Bit" was shown. It consists of a steel spindle with screwed point like the auger, and has a plate about two inches long formed behind the screw, and about one inch broad. A cutter is formed on one of the edges, and there is a steel knife with oblong hole to admit a steel screw to fix it to the flat part of the spindle at any distance required to form the exact size of the hole. The knife has a sloped point set at any angle, as the plane iron.

American augers, such as "Jenning's Spur Auger Bits," from the manufactory, Deep River, Connecticut, are in use in Great Britain generally,—indeed, they are found in the northern parts of this coun-

try; they are somewhat more expensive than home-made augers, but are preferred in many instances on account of the excellence in the workmanship and quality of the tool. Altogether, the Philadelphia Exhibition has fully established the reputation of American augers.

In the section of tools comprising cast-steel chisels, gouges, turning and carving tools, there was a good exhibition. The larger sizes for heavy work are furnished with sockets for the handle, while the smaller descriptions are made with a shoulder and tang. In the best tools, the shoulder is made out of the solid. A very large assortment of this section was shown by MESSRS. BUCK BROTHERS, *Riverlin Works, Milbury, Massachusetts.* Tang tools of considerable variety were exhibited; they are well made, and the finish of the turning tools and the plane irons is of a superior character.

The D. R. BARTON TOOL COMPANY, *Rochester, New York*, exhibited a good selection of mechanics' tools of different kinds, of good workmanship; the smaller size have been turned out with a very neat appearance.

A case of scientific tools for brass, iron, and wood turnings were exhibited by MESSRS. WARD & PAYNE, steel manufacturers, *Sheffield, England;* they showed, also, all the varieties of tools used by carpenters, millwrights, masons, and bricklayers, all of a high class. Their display further embraced a superior assortment of cast-steel carving and turning tools for iron, brass, ivory, and wood gravers for die-sinking; the firm also manufacture sheep-shears of excellent quality.

The STAR TOOL COMPANY, *Middletown, Connecticut*, in addition to the usual variety of carpenters' tools, exhibited a select assortment of squares with rosewood stocks, and steel blades accurately graduated to different divisions of an inch; also, bevel stocks made in the same style, flexible steel rules to 36 inches, and a variety of steel calipers; the whole of this exhibit was very attractive, and the prices are moderately charged; a 12-inch square being only $1.00.

An extensive collection of tools from MESSRS. J. B. ADDIS & SONS, edge-tool manufacturers, *Sheffield, England*, comprised sets of tools for carving stone and wood in all the varieties; they are of the finest cast-steel and made in a thoroughly first-class style. Turning tools of the same quality for ivory, iron, brass, and wood were also shown, as well as a good collection of the usual carpenters' tools.

A most interesting exhibit was that of DARLING, BROWN, & SHARPE, *Providence, Rhode Island.* It consisted of a varied selection of instruments of precision, such as steel squares, rules, calipers. The

extreme perfection with which the scales were graduated was charming, and their vernier caliper reads to $\frac{1}{1000}$ of an inch. Such an instrument must be highly valued by the intelligent workman.

PLANES, ETC.—A great part of the marked advance in the improvement of workmen's tools which has been made during recent years is justly due to the inventive genius of American citizens, and in the section of planes exhibited in the Centennial Exhibition this is fully confirmed by an important change in the structure of the tool.

The planes manufactured in Great Britain and in other countries fifty years ago were formed of best beechwood; the plane irons were of steel and iron welded together; the jointer plane, about 21 inches long, was a bulky tool; the jack and hand planes were of the same materials. Very little change has been made upon the plane in Great Britain, unless in the superior workmanship and the higher quality of the plane iron. American planes have now found their way into Great Britain, and it will be seen whether the old type is to be preferred, or whether a fair trial is to be granted to the manufactures of the New World.

The American plane is constructed with a skeleton iron body, having a curved wooden handle; the plane iron is of the finest cast-steel; the cover is fitted with an ingenious trigger at the top, which, with a screw below the iron, admits of the plane iron being removed for sharpening and setting without the aid of the hammer, and with the greatest ease. The extensive varieties of plane iron in use are fitted for every requirement; a very ingenious arrangement is applied to the tools for planing the insides of circles or other curved works, such as stair-rails, etc. The sole of the plane is formed of a plate of tempered steel about the thickness of a handsaw, according to the length required, and this plate is adapted to the curve, and is securely fixed at each end. With this tool the work is not only better done but in less time than formerly. In some exhibits the face of the plane was made of beech or of other hard wood, secured by screws to the stock, and the tool becomes a hybrid, all the other parts remaining the same as in the iron plane.

A few examples of the old type of beech plane were shown, remarkable for the superior quality of the workmanship, and were mounted with polished iron starts. The finish of the iron planes was different according to requirement; some were ground and japanned, others polished, and some nickel-plated, the higher finish being on the smaller sizes. It was stated by one firm that their output had amounted to 80,000.

There were twelve exhibitors to a greater or less extent of first-class workmanship, among whom the following were included: the METALLIC PLANE COMPANY, *Auburn, New York;* the MIDDLETOWN TOOL COMPANY, *Middletown, Connecticut;* BAILEY, LEONARD, & CO., *Hartford, Connecticut;* THE SANDUSKY TOOL COMPANY, *Sandusky, Ohio.*

Some of the above exhibited wooden bench- and hand-screws, squares, levels, etc. In several exhibits of carpenters' tools there were a variety of braces and bits, very good specimens of tool-making. There were a few examples of a different construction, having an expansive chuck for the bit. The steel jaws were jointed to a screwed end which fitted into a screwed "sleeve" or socket. The jaw would admit different sizes of bits in the squares, and when placed the sleeve was screwed on to the holder, and the bit remained quite secure. The exhibits of the MILLER'S FALLS COMPANY, *Massachusetts*, and WM. A. IVES & CO., *New Haven, Connecticut,* contained beautiful examples of the expansive brace; the prices were stated at from $5 to $8. The several exhibits in the section formed an attraction to the numerous artisans who visited the Centennial Exhibition from the United States and other countries.

VISES.—It may be proper, before closing the section of hand-tools, to select a few used in manufacture of iron, such as the vise. The usual construction of the common vise is well understood; the movable side is jointed to the standard from 15 to 18 inches below the level of the jaw. The consequence is that when opened a few inches the jaws are not on the same plane, and, beside this inconvenience, the constant injury to the screw and box through carelessness is expensive. Several examples of vises constructed on new principles were exhibited.

The STEPHENS PATENT VISE COMPANY, *New York, N. Y.*, showed an extensive selection of parallel vises with width of jaw from 2 inches up to 6½ inches. The tool is cast in two separate pieces with steel facings; the front jaw is attached to a parallel bar, planed and correctly fitted to a recess in the main body of the tool, and may be moved forward and backward with ease. On the right edge of the bar a steel rack is inserted cut with ratchet teeth, which are acted on by a handle in connection with an arrangement of a cam and toggle. The parallel bar is pulled out to the extent of 10 inches (in the larger sizes) at once, and closed by the hand upon the article to be held; the handle is then pulled tight, and whatever is in the vise is held many times more firmly than is possible with any other vise. Upon the lower

side there is a swivel arrangement which admits of the vise being turned to any angle required. This vise has been well tried, and seems to bear out all that the patentee claims.

SIMPSON'S Adjustable Parallel and Swivel Vise is worked in the same manner as the common screw vise; at the same time the jaws can be instantly opened or closed the full length by one movement of the hand without the use of the screw. This vise is well proportioned, with steel-faced jaws, the screw and the ingenious mechanism are concealed in the interior, and are therefore free from injury by dirt or filings, and as the screw is only used to give the grip they wear exceedingly well.

FILES.—It is not easy to institute a comparison in the quality of this class of tools; the cutting, which is the only element that can be seen, is not sufficient evidence to fix a true value of the worth of the tool. Sheffield held for many years the front place in the manufacture of files; this did not altogether depend upon the excellence of the cutting, but mainly on the high quality of the cast-steel, and on the skill shown in the process of tempering.

There were at Philadelphia 16 exhibits, and of this number there were from manufacturers of the United States 11; Sweden, 5; Great Britain, 2; Switzerland, 3; France, 1; Belgium, 2; total, 24.

The files were in two distinct classes, viz., machine- and hand-made.

Only two of the latter class were shown, by MCCAFFREY & BRO. and ALEXANDER KRUMBHAAR, both of *Philadelphia, Pennsylvania.* Their exhibits contained several varieties; the cutting was executed with accuracy, and showed considerable skill.

An exhibit near the east end of the Machinery Hall contained excellent examples of massive files for engineering purposes, from 18 to 20 inches long; the workmanship, considering the breadth of the flat hand files, was exceedingly good; the exhibit was highly creditable.

THE WESTERN FILE COMPANY, *Beaver Falls, Pennsylvania,* and the NICHOLSON FILE COMPANY, *Providence, Rhode Island,* were placed beside each other; the exhibits contained extensive assortments of machine-made files of every description; the cutting was well executed in the larger and smaller sizes; the smooth files were beautifully made. The round files of the Western File Company were executed in a superior style.

The exhibit of HAWKSWORTH, WILSON, ELLISON, & Co., *Sheffield, England,* was very extensive; one of the divisions contained files

which were of first-rate quality, maintaining the reputation of the firm in Sheffield manufactures.

LIMET-LAPAREILLE & Co., *Paris, France*, showed two cases of various sizes. They were principally intended for machinists, and were very well adapted for their purpose.

A very fine exhibit from A. DE LAMBERT, *Liège, Belgium*, of some extent, contained a great variety of fine cast-steel files of small size for jewelers and watchmakers. Some of the examples did not exceed 2½ inches; when examined through a glass, there was evidence of a skillful hand and of an educated workman.

Files somewhat of the same type were exhibited by LOUIS FRANÇOIS GROBET, *Vallorbe, Ct. Vaud, Switzerland;* they formed a very creditable display.

I. MARC SERVET FILS, *Geneva, Switzerland*, VAUTIER & SONS, *Carouge, near Geneva, Switzerland*, and JULES LERESCHE-GOLAY & Co., *Vaulion, Ct. Vaud, Switzerland*, had each an exhibit of the same class of tools; that by Vautier & Sons was of superior excellence. Indeed, the cutting of the finer description of the smaller size from Switzerland, and also France and Belgium, showed a delicacy of touch not often seen, and the inspection of their tools produced real pleasure.

SCREW-CUTTING.—The number of screwing-machines now in use, and the increase of bolt and nut manufacturers exclusively engaged in the trade, render the use of the ordinary screw plate or die stocks less necessary than it was formerly. In the Exhibition there were only a few exhibits where screwing-tools were represented.

An excellent exhibit was shown by the MORSE TWIST DRILL AND MACHINE COMPANY, *New Bedford, Massachusetts.* We had here a selection of tools of a high character. The taps and dies are made from specially-imported steel, and are supplied to either of the American standards or to the Whitworth as required. The screw plates are made of a slight character, and the manner in which the die is fixed admits of its being quickly changed. The exhibitors also manufacture a tool for screwing pipes up to three inches in diameter; the die in this case is solid, and is fitted into a box with two handles. In addition the exhibit contained twist drills, chucks, and wrenches of superior quality.

J. M. CARPENTER, *Pawtucket, Rhode Island*, also showed a good selection of stocks with taps and dies. The stocks are constructed on an excellent principle for fixing and changing the dies. The taps and dies are made of special steel to any gauge in sets of three taps to one pair of dies. The stocks are well proportioned.

AGRICULTURAL AND LABORERS' TOOLS.—There were several exhibits connected with agriculture and other kinds of labor which were brought under the consideration of Group XV.

Looking at the exhibits shown in this class at Philadelphia, we are surprised that the great improvements which have been made in the United States in agricultural tools had not been introduced many years ago. The spade was made formerly by having two layers of iron, and a thinner plate of hoop L or of shear steel placed between them by the usual process of welding. The spade was made solid, then cut to the required size, and the scales at the top formed for the handle.

The old hay-fork was made altogether of iron, or occasionally the prongs were pointed with steel. With its iron ferrule and strong ash handle, it was a very cumbrous tool. The manure-fork had usually three prongs, sometimes flat, about an inch broad, and was occasionally improved by forming the prongs in the shape of the letter V. If the hay-fork was cumbrous the manure-fork was doubly so. No accurate judgment can be formed of the many advantages which have been conferred on the laborer by the introduction of the American steel spade, shovel, manure- and hay-forks, arising from the surface of the metal remaining clean, and the edges or points sharp, while, as it was stated in the Exhibition, the difference of weight between the old style and the new steel spade was from 3 to 4 pounds in favor of steel.

The exhibition of the A. S. WHITTING MANUFACTURING COMPANY, *Ottawa, Ontario*, contained a varied collection of steel hay- and manure-forks, hoes, and garden tools, of excellent quality and workmanship, and extremely light. As is well known, this quality of goods has for years been imported into Great Britain, being preferred to the older form on account of lightness, and for the freedom with which they can be worked for a much longer time than the heavy forks of former years.

The AMERICAN SHOVEL COMPANY, *Birmingham, Connecticut*, exhibited several specimens of steel shovels and scoops; the shovels are of sufficient thickness, and well fastened to properly-shaped handles. The shovel is polished, is comparatively light, and of good workmanship. The scoops are well made, and very suitable for the intended purpose.

The MIDDLEBORO' SHOVEL COMPANY, *Boston, Massachusetts*, also showed a variety of steel shovels and spades, made up in the usual manner, with good ash handles; the implements are polished and well suited for work.

B. ROWLAND & Co., *Philadelphia, Pennsylvania*, exhibited an exten-

sive assortment of shovels, spades, and scoops, draining and ditching tools; the manufacture of the implements comprised in this exhibit was marked by careful attention to the best construction of the different tools, and to the lightness of the implement consistent with the necessary strength and fitness for the purpose. The exhibit was very commendable for design and workmanship.

CLASS 281.—CUTLERY.

In this class several of the exhibits contained only one section of the class, while others presented several varieties. In this report the remarks must be limited to those exhibits which best represent the present state of the art in the different nationalities, the purpose being to present a mere general sketch of the grand display exhibited at Philadelphia, and convey an impartial idea of the progress of this particular branch of industry.

Cutlery has been the most important product of the Sheffield district for centuries, and in our day Sheffield still maintains a prominent position in the department of steel manufacture. Still, the number and excellence of several of the exhibits at Philadelphia show clearly that there exists an active emulation among the manufacturers of cutlery in several of the countries in Europe, but especially in America, where during recent years great improvements have been made in the manufacture, both in the taste and in the quality of the goods, which is very remarkable. The quality of fine cutlery depends mainly on the character of the steel, upon the workman's skill, and on the taste shown in the finish of the handle, though the last may be considered as secondary to the others. The mode of joining the handle to the blade is also an important point. It may be assumed that for the finest branches of cutlery the best quality of cast-steel of Sheffield manufacture is generally adopted. This has been stated by some of the exhibitors of fine-class goods, in answer to inquiries regarding the character of the steel used in the manufacture, and is a fact of vast importance not only to Sheffield but to England.

UNITED STATES.

The most extensive exhibit of this class was the property of the JOHN RUSSELL CUTLERY COMPANY, *Green River Works, New York, N. Y.*, and comprised every variety of table cutlery, mounted with handles of pearl, silver, plated handles, ivory, horn, and fancy woods. The carving-forks had an improved guard of a double form; the guard on the upper side was made in the usual manner, but the lower half

of the guard was formed with double points, resembling a short fork, slightly turned up, and forming a rest for the fork when not in use, and admitting of being forced back when laid aside. A grander display than this exhibit, especially of the finer sections, has rarely been witnessed. The varieties of style, the uniform excellence of the manufacture, as shown by the specimens, were deserving of the highest praise.

The MILLER BROTHERS CUTLERY COMPANY, *West Meriden, Connecticut*, exhibited an extensive assortment of pocket-cutlery in all the different varieties and qualities. An interesting part of this exhibit consisted in showing specimens of their goods in the consecutive stages of the manufacture, namely, the forged blade, the progress of finishing, tempering, grinding, and polishing, the preparation of the handle, and final finish. The examples contained in this exhibit were of tasteful designs and excellent workmanship.

R. HEINISCH'S SONS, *Newark, New Jersey*, exhibited a varied selection of tailors' and other descriptions of shears and scissors. The specialty of this exhibit consisted in the manufacture of tailors' shears, which had a peculiarly-formed handle, made by Mr. Heinisch's Sons out of cast malleable iron, to which in the process the cast-steel face is attached. The manufacture was skillfully executed; it was difficult to see (when the shears were polished) where the union of the two metals had taken place. It was stated that many of this description were exported to Great Britain. The whole of this exhibit indicated careful workmanship, and was very creditable.

A well-selected variety of razors was exhibited by FRIEDMAN & LAUTERJING, *New York, N. Y.* These were described as "concaved razors manufactured out of India steel." The "India steel" may be assumed to mean that a slight alloy of silver has been added to the cast-steel in the process of manufacture. Most razors have a degree of concavity more or less; this exhibit, however, showed, upon examination, to have the concave carried almost up to the back of the razor, and in this manner the edge appears extremely fine. The workmanship of the blades and of the ivory mountings was of excellent quality. This firm also exhibited a variety of razor-strops made of strong Russian leather; the strop was fitted on to a slight frame of wires about ¾ inch apart and 8 inches long, and the frame was connected to the handle by an adjusting-screw by which the strop could be tightened as required; the strops were very neatly made.

The MERIDEN CUTLERY COMPANY, *Meriden, Connecticut*, exhibited a choice selection of table-cutlery in all its varieties. They claim a specialty in the material of which the handles are formed; it bears a

close resemblance to ivory, and takes on a fine polish; it was stated to be a third cheaper than the ivory handle. The best qualities of the exhibit were of superior workmanship.

GREAT BRITAIN.

GEORGE WOSTENHOLM & SON, *Sheffield, England*, exhibited a well-arranged assortment of razors, pocket-knives, scissors, and general cutlery; the examples were tastefully designed, and executed in a superior style. It was the unanimous decision of the Judges that the exhibit of George Wostenholm & Son, in point of tasteful design, quality, and style of finish, was not surpassed by any exhibit in the same class at the Centennial Exhibition.

A large display of cutlery by BROOKS & CROOKES, *Sheffield, England*, comprised a varied selection of table- and pocket-knives, scissors, and toilet-furnishings; also, hunting-knives, dirks, etc. This firm manufacture their own steel. The exhibit showed considerable taste in the unexceptionable quality of the goods.

The exhibit of THOMAS KINGSBURY, *London, England*, contained a varied assortment of razors, knives, scissors, dressing-case instruments, and several specimens of processes of manufacture. The variety of specimens in different classes were of good design and of excellent quality; the specimens in progress were in the usual form.

WILLIAM WILKINSON & SONS, *Sheffield, England*, exhibited a different class of cutlery from any of the other Sheffield firms, viz., a selection of pruning-shears and farriers' knives. The value of this class of tools consists in the quality of the steel, and in the skill of the workman in their construction; a high finish is not required. This exhibit evinced great care, and the tools were admirably adapted for the purposes intended.

FRANCE.

A very large case, divided into several compartments, contained the exhibits of individuals from *Haute Marne*, viz., RENAUT GUILLEMIN, CHARLES GIRARD, COURCELLES SOMMELET, FELIX THÉVENOT, J. CHARBONNE-THUILLIER, WICHARD COUVREAUX; also, VITRY FRÈRES and THINET, from *Paris*. The separate exhibits thus combined almost uniformly, to a greater or less degree, contained the same description and quality of examples, viz., hunting- and pocket-knives, kitchen- and mincing-knives, daggers, razors, folding and common scissors, and a variety of corkscrews and pruning-shears. In this very extensive exhibit there did not appear to be any specialty (with one exception to be noted) to require any particular remark. A uniform

creditable type of workmanship was well maintained by every exhibitor, and where a better style of finish was required the work (with few exceptions) was executed with skill. It is easy to see that this combined form of exhibit may be very economical, but it is equally clear that it has its disadvantages, in the difficulty with which an examination of the articles can be made.

The exception above noted has reference to the exhibit of Courcelles Sommelet, which contained a selection of shears and scissors, kitchen-knives, etc., the product of the labor of juvenile offenders, the inmates of a reformatory institution, and in the circumstance not without merit. It was understood that the whole of the work was done within the walls of the institution.

A new form of sheep-shears was exhibited by V. PÈRARD, *Paris*. They are constructed on much the same principle as the clipping-shears now generally used for horses. In inexperienced hands, their employment would greatly diminish the risk of cutting the skin, and the new form is on that account a great improvement on the ordinary shears for clipping wool.

AUSTRIA.

The only exhibit in this class was by WENZEL SCHNEIDER, *Prague*, consisting of a selection of pocket-cutlery of excellent quality and of beautiful finish.

SWEDEN.

F. W. SODERÉN, *Eskilstuna*, exhibited a selection of shears and scissors of great merit; the examples shown were of superior quality and meritorious.

The exhibit of THE SANOVIKENS IRON & STEEL COMPANY, *Gefle*, contained a number of razors, knives, and scissors. The whole of the examples were said to be manufactured out of Bessemer steel made by the company. From the workmanship and finish shown on the goods the specialty of the steel would appear to be of a superior kind. It opens a new (though probably not the most suitable) use for this cheap quality of steel.

There was a fine exhibit of razors from C. V. HELJESTRAND, *Eskilstuna*. The blades were of the finest steel; the handles were mostly of ivory, tastefully engraved. The examples shown were executed in a most superior manner.

C. ALFRED MORSTROM, *Eskilstuna*, exhibited a selection of hunting-knives of best quality of steel, mounted with tastefully-carved handles, with silver hoops and ornaments,—altogether a fine display of superior workmanship.

GERMANY.

H. Boker & Co., *Solingen*, exhibited a very fine display of pocket-knives, scissors, etc. The examples were doubtless made up for exhibition. The pocket-knives and scissors were from the finest steel, and were remarkable for the high class of the workmanship. There was also supplied, at request, a selection of the ordinary manufacture, of good quality and at moderate prices. Altogether this exhibit was considered to be of a very superior kind, and showed the amount of careful attention that had been bestowed upon it.

RUSSIA.

A very extensive selection of table- and pocket-cutlery, pruning-knives, and shears, was exhibited by John Kaliakin & Sons, *Pavlovo, Government of Nijni Novgorod.* The table-cutlery comprised a variety of the usual requirements included in that class; the taste shown in the variety of the handles was excellent. The pocket-knives were beautiful in style, and indicated skillful workmanship. The pruning-knives and shears were of good quality and carefully made. Altogether this selection was very commendable.

The exhibits from Demetrius Kondratoff, *Vatcha, Government of Vladimir*, and Alexis Zavialoff, *Vorsma, Government of Nijni Novgorod*, comprised the same examples of table- and pocket-cutlery; the specimens were of good quality, and the taste shown in the workmanship very creditable. The pruning-knives and shears from Novgorod showed skillful workmanship, which in both exhibits was very superior.

SWITZERLAND.

C. F. Schneider, *Geneva*, exhibited an assortment of knives both with single and multifarious blades; both descriptions showed very great taste in the arrangement and in the fine quality of workmanship, for which the Swiss for long years have been justly distinguished. The beautiful arrangement of the many-bladed knife was very attractive.

Jacques Le Coultre, *Sentier, Ct. Vaud*, exhibited a collection of razors of different patterns. The specialty of the exhibit consisted in having cases containing a number of razors with one handle, by which a different razor could be used each day; the examples were made of the finest steel, and beautifully ground and polished. The blades were formed with a short tang which fitted into a steel socket of the same form as the end of an ordinary razor.

After a general survey of the cutlery exhibition, we are forced to give to America the first place for table-cutlery.

For pocket- and fine cutlery the pre-eminence of Sheffield was maintained by Westenholm and Brooks & Crookes. France did scarcely justice to herself in the exhibits sent to Philadelphia.

The display of Germany in pocket-cutlery was no doubt equal to any from the United States, showing great beauty and high excellence of finish.

The Russian exhibits from Novgorod showed an advance which we were scarcely prepared to see; and Sweden also deserves to be noticed, her products being somewhat of the same quality as those of Russia.

SKATES.—The FLORENCE SEWING-MACHINE COMPANY, *Florence, Massachusetts*, showed an assortment of ice-skates; the specialty consisted in the mode by which the skate was attached to the foot. A strap passes around the ball of the foot, and from heel over instep, and the skate is secured to the boot by a thumb-screw at the back of the heel. It was understood that a patent had been obtained for this mode of fixing.

The STAR MANUFACTURING COMPANY, *Halifax, Nova Scotia*, exhibited, with their general collection, a beautiful stand of the "Acme Patent Club-Skate." The skates were shown in great variety, of elegant style, and of superior finish. The exhibit obtained an award of merit.

A different variety of skate was exhibited by the PLIMPTON ROLLER- AND ICE-SKATE COMPANY. The exhibits were of the ordinary type. There was no specialty pointed out, though the style and workmanship were of very good quality.

CLASS 282.—POLISHING AND BURNISHING MATERIALS.

There is little to be said on this class, although the importance of the materials included under it is beyond dispute. To take emery: the part which it is now playing in cutting-wheels and in wheels for surfacing in machinery is producing many changes in the modes of production; but here we have only to deal with it as a material for polishing. In the class there were two main divisions, viz., burnishers and materials for polishing.

GEORGE LEYKAUF, *Nuremberg, Bavaria*, exhibited a fine collection of burnishing-tools for use in gilding. These burnishers were made of chalcedony and jasper. These stones, which are found in abundance in Eastern Europe, had their points formed in every variety of

shape, so that they might be applied to every part of an ornamental carving. They were very highly polished, and fixed on wooden handles. This was a beautiful exhibit.

JAMES TAYLOR, *Providence, Rhode Island*, made a display similar to that just described. These burnishers were adapted for use on carved wood and picture-frames, or such like articles of furniture.

As is well known, the burnishers used for metals are very different from those used for gilding, being composed of fine steel blades with a perfectly smooth edge, the form being governed by the manner in which the burnisher is to be employed. The preparation of the surfaces to be burnished is effected either by the file or by the process of grinding. The ordinary grindstone, in some cases, may be sufficient in the first instance, but the emery-stone is found more expeditious. It is used with water or dry, and is driven at a high speed. To perfect the surface, emery-wheels of different grades of fineness are used in their turn. Crocus buffs are next employed, and ultimately putty-powder, which is found sufficiently fine to produce a finished surface.

The most important of the grinding-materials is emery, a mineral of the hardest quality, and universally used in the manufacturing departments of art in grinding and polishing plate-glass, lenses, precious stones, granite, and in engine- and machine-shops. Emery is found in the east of Europe in lumps of considerable size, and sufficient, in some cases, to form wheels for grinding from 15 to 18 inches diameter and 2½ inches thick. The emery-stone is often carefully fixed upon an iron spindle, and in this form is extensively used either dry or with water. The smaller pieces are broken down into fragments, and are ground to any required grade in the rolling-mill. Sometimes the separation of the different grades is effected by an elaborate process of washing, but in some of the recently-erected manufactories in England the rolling-mill, with its variety of sifters, has been found more economical in point of time and labor. It is stated that the finest grade of flour-emery has been found to be the dust falling from the grinding and sifting processes, which is carefully removed from prepared receptacles formed so as to prevent the chance of any foreign matter being mixed up with it. The coarser varieties are numbered by consecutive figures thus: 0, 0½, 1, 1½, 2, 2½, 3; in some cases the qualities are marked by the number of meshes contained within a square inch; this mode is much more likely to be satisfactory than consecutive numbers. This material is also manufactured into emery-cloth and paper by first coating the paper with prepared glue and sifting the emery evenly on the sur-

face; the cloth is generally of coarse calico, and is treated in the same manner as the paper. Flour-emery-cloth requires a finer cloth; the process of sifting is the same. When skillfully prepared the emery-cloth is preferable to the paper; it endures greater fatigue, is not so liable to tear, and can be used for a longer time. Emery is also used for scythe-sharpeners by forming a piece of wood into the shape of a flat file with handle, and about 2 inches broad, 12 inches long, coating it with glue, and dipping the wood once or twice in a heap of emery. Emery is also applied to buffing-wheels by mixing it with beeswax and melted fat well worked together.

Crocus is applied in the same way. Crocus is the finely-divided red oxide of iron, and is carefully prepared and reduced to a fine powder, free from grit; the cloth is covered with this powder in much the same form as in the process of covering cloth with flour-emery.

The examples of these various articles shown were subjected to a severe test without any appearance of weakness, and the emery never showed any parting from the cloth in the slightest degree. In the exhibit of FREEMAN K. SIBLEY, *Waltham, Massachusetts*, especially, the surfaces were beautifully regular, and the whole worthy of commendation.

CLASS 283.—METAL HOLLOW WARE AND ORNAMENTAL CASTINGS.

This class comprises a number of objects which, from their beauty, attracted a large number of admiring spectators.

There is hardly a civilized country where the bronzes of antiquities of Greece and Rome—nay, even of China and Japan—are not admired and imitated. To France must be given the highest place as the mistress of artistic bronze in modern times; but we are reminded by this Exhibition that a large group of artistic metal productions have sprung up in various countries, though all to a greater or less degree in sympathy with the character of the French bronzes. Among these we notice the zinc- and iron-castings of Germany and the United States.

The ornamental use of zinc is of very modern date. Indeed, it owes its origin to the desire which the general spread of refinement has produced, of having about us in our homes articles in which pure artistic feeling is present. To the rich this was always within reach, but to the poorer classes the possession of a good bronze was a thing not to be thought of. The comparative cheapness of zinc figures, more especially when cast by the hundred from a perfect metal mould, has brought the possession of beautiful objects within the reach of persons with slender incomes, and a large trade has

thereby been created. The principal necessity for perfection lies in the preparation of the moulds, which, whether of sand or of metal, must be without fault and equal in finish to a piece of sculpture. The same remarks apply to the iron-castings which have found homes in Germany and the United States, where they are produced in great variety and perfection. The sharpness of many of these castings is wonderful, and convinces one of the need, first, of a perfect mould, and, secondly, of a very fluid metal.

In the Exhibition by far the largest and most important display was that of the J. L. MOTT IRON-WORKS, *New York, N. Y.* The extreme elegance of the iron figures was sufficient index of the artistic feeling of the modeler, while the delicacy with which the various bronzes were applied to the surface showed that the American workmen were in no respect inferior to those of Europe. A large fountain in the centre circle of the Main Building was throughout of the highest character, and extracted praise from every one who inspected it.

Another exhibit of zinc-castings was shown by CONRAD FELSING, *Berlin, Prussia*, containing a collection of bust statuettes. The castings were remarkably sharp and clean, and tastefully imitated in bronze color; this exhibit possessed great merit.

ALOIS WINKLER, *Vienna, Austria*, exhibited a series of zinc figures and letters, in different styles, executed in a very skillful manner, and of beautiful designs.

GRAF STOLBERG, *Ilsenburg, Germany*, exhibited several iron-castings of great merit. Two castings of engraved shields were particularly noticeable; they were about 20 inches diameter, and cast in sand. They were extremely light, the pattern had been richly engraved, and the casts were both smooth and sharp; nothing had been done to improve them by filing; one of the castings had not had the sand brushed off. The exhibit was greatly commended.

A novelty in casting which we had not previously seen consisted of an exhibition of sash-weights; some were broken in pieces to show the quality of the metal; the Judges were informed by the exhibitor, J. H. ARMBRUSTER, *Philadelphia, Pennsylvania*, that he employed laborers with carts to collect during the morning every article of worn-out tin plate or sheet-iron, in whatever shape, used for domestic purposes that had been thrown out upon the street. The weight of the rubbish gathered in this manner was surprising, as was also the product from the furnace. At present it is made into sash-weights of a much higher specific gravity than ordinary iron. The metal also shows a degree of hardness equal to spiegeleisen or franklinite, and resists any attempt to operate upon it with the hardest steel. It is

quite within the range of possibility that this product may yet be applied to more important purposes than sash-weights. The industry of the exhibitor was highly commended.

Class 284.

A very great variety exists in the different articles grouped under the head of Class 284. The remarks are confined to the following sub-classes, viz., bolts and nuts, screws and nails, horse-shoes, bells, anvils, etc.

Bolts, Screws.—There was a particularly good representation of these articles, some of the cases containing thousands of specimens. Probably the point which most attracted attention was the surprising manner in which cold punching had been applied in the manufacture of nuts. Specimens cold-punched were shown with a hole of ½ inch diameter through a nut of nearly 2 inches depth. The cleanness of the perforation was perfect, and showed that the doctrine of the flow of solids, so well expounded by M. Tresca, is beginning to bear fruit. The material of the punches used must have been excellent, and time for the material of the nut to move must have been fully allowed.

The extensive exhibit of Hoopes & Townsend, *Philadelphia, Pennsylvania*, contained almost every size and form of bolt and nut, car-forgings, cold-punched nuts, all manufactured from the best brands of refined iron, and with the best workmanship.

There was included a collection of elevator- and carrier-chains with punched links. In the manufacture of such chains it is necessary to see that equal strength is given throughout the various parts of the link, and it will be well for those interested to study the account of the recent experiments which have been made with the view of determining very exactly the strength to be given at the eyes of the links.

The Patent Bolt & Nut Company, *Birmingham, England*, exhibited an immense number of bolts, spikes, rivets, clench-rings, etc. Some of the specimens were sawn through the centre longitudinally to show the fitting of the bolt and nut; this was a fine display.

Messrs. Pierre & Nicolas Nicaise, *Marcinelle, near Charleroi, Belgium*, showed bolts and nuts, as well as forged rivets and clamps, for railway purposes. These articles were well made, and the material was of high quality.

Screws and Nails.—The American Screw Company, *Providence, Rhode Island*, presented a very extensive collection of steel, iron, and brass screws for every purpose, from ¼ inch to 5 inches in length. The importance of this display may be estimated from the fact that 3000 varieties were exhibited, all manufactured from excellent mate-

rial and in every respect meritorious. The gimlet-pointed screws particularly attracted notice for the efficiency of their design for penetration, and the steel screws were especially good.

PILLOW, HERSEY, & CO., *Montreal, Canada*, exhibited brads, spikes, and nails in endless variety and kind suitable for general use. The fine quality of the iron and the workmanship were highly commended.

France sent a beautiful display of decorators' nails and ornaments, manufactured in brass, steel, and bronze. The exhibitor was CELESTIN CARMOY, *Paris*. The numberless varieties submitted were very tastefully designed and beautifully executed. The French nation seem to have had, and even now to maintain, a superior power in the artistic design and production of such articles as are above referred to.

HORSE-SHOES.—Probably nothing was better represented than the manufacture of horse-shoes. The world has come to see that there is much to be done in improving the horse-shoe, at least very much beyond the point reached twenty or thirty years ago. The increased value of horses and the more refined ideas of what our treatment of animals should be have together resulted in much attention being paid to shoeing. While in England Mr. Fleming has probably led the way to improvement, in America many minds have been studying the subject. It is thus that we found at Philadelphia a grander collection of horse-shoes, both as regards finish and variety, than had at any previous time been presented to the world. To bear this out it may be stated that one American firm produces weekly 600 tons of shoes, and another from 200 to 250 tons.

MESSRS. H. BURDEN & SONS, *Troy, New York*, exhibited a large number of horse- and mule-shoes. They were machine-made, the insides of the shoes very properly hollowed out with correct form. Some specimens were tested for quality, and the material found to be the best Port Henry iron. This was a very superior exhibit.

The RHODE ISLAND HORSE-SHOE COMPANY, *Providence, Rhode Island*, sent a collection of machine-made shoes of selected scrap. They were particularly noticed on account of their smoothness and excellent finish.

S. S. PUTNAM & CO., *Neponset, Massachusetts*, showed hammer-pointed horse-shoe nails, very clean, and made of a superior quality of iron.

The NATIONAL HORSE-NAIL COMPANY, *Vergennes, Vermont*, displayed different varieties of machine-made horse-shoe nails, both plain and polished. They were uniformly well made, and found to be of excellent quality.

AARON W. SMITH, *Manchester, New Hampshire*, exhibited a flexible horse-shoe for the relief and cure of contracted or flat feet. The shoe is formed with a joint at the toe. From the number of certificates of cures effected by the use of these shoes it was apparent that they are very efficient. The style in which the shoes were made was very creditable.

MESSRS. HOTCHKISS' SONS, *Bridgeport, Connecticut*, claim to have the largest and most complete selection of curry-combs. Their exhibit undoubtedly showed great numbers and varieties, with open and closed backs, plain and ornamental, with from 5 to 8 bars, and several with the mane- and curry-comb combined. This display evinced great care and study in the production of the articles.

BELLS.—The GONG-BELL MANUFACTURING COMPANY, *East Hampton, Connecticut*, exhibited a case of polished bells for hand-, call-, and sleigh-bells; also a stand of gongs, of which several were mounted. The examples were beautifully finished, and excellent in tone and quality.

The BEVIN BROTHERS MANUFACTURING COMPANY, *East Hampton, Connecticut*, exhibited a large assortment of the same class of goods of very creditable workmanship.

VANDUZEN & TIFT, *Cincinnati, Ohio*, exhibited several examples of bells for churches, and gongs of clear tone and of good workmanship.

ANVILS.—MESSRS. FISHER & NORRIS, *Trenton, New Jersey*, exhibited anvils of a rather novel construction, being cast-iron for the body and faced with steel. The process of the manufacture of these articles is essentially American. The difficulty of welding large masses of wrought-iron to the steel face (which has been generally the plan followed) has been got over by the introduction of cast-iron. The examples shown were of considerable weight. The steel face was sound, and appeared to be completely united to the iron. On the polished surface there was no appearance of crack or flaw. The exhibit was highly commended.

An immense number of manufactured goods were shown by the BENEDICT & BURNHAM MANUFACTURING COMPANY, *Waterbury, Connecticut*. This exhibit is mentioned in order to refer to the great excellence of the rolled sheets of brass, copper, and German silver. These plates were of large size, and the surfaces were so fine and perfect that they acted as reflectors. This company also had some specimens of chain which were much admired for their clean manufacture.

REPORTS ON AWARDS.

GROUP XV.

1. Henry Disston & Sons, Philadelphia, Pa., U. S.

SAWS, TROWELS, PLUMBS AND LEVELS, SQUARES, HINGES, AND TURNSCREWS.

Report.—A very large display, of surpassing excellence of material, style, and finish; every article worthy of the highest commendation.

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2. Nicholson File Co., Providence, R. I., U. S.

FILES AND RASPS.

Report.—Commended as exceedingly well cut and of excellent material.

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3. Freeman K. Sibley, Waltham, Mass., U. S.

EMERY AND CROCUS CLOTH.

Report.—Commended as of excellent quality and highly meritorious.

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4. Benjamin Forstner, Salem, Oregon, U. S.

PATENT PERPETUAL LIP AUGER-BITS.

Report.—Commended as an ingenious and most useful tool.

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5. Enterprise Manufacturing Co., Philadelphia, Pa., U. S.

SAD-IRONS, COFFEE-MILLS, AND TOBACCO CUTTERS.

Report.—Commended as a large assortment of useful articles and of improved styles.

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6. Eben Moody Boynton, New York, N. Y., U. S.

SAWS IN GREAT VARIETY; SPECIAL IMPROVEMENT IN SHAPE OF TEETH CALLED "PATENT LIGHTNING SAWS."

Report.—Commended as of very superior quality and of great practical utility.

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7. Baeder, Adamson, & Co., Philadelphia, Pa., U. S.

SANDPAPER, EMERY PAPER, AND EMERY CLOTH.

Report.—Commended as handsomely made and of excellent quality of material and manufacture.

8. **Stephens Patent Vise Co., New York, N. Y., U. S.**

PARALLEL VISES AND PLANER CHUCKS.

Report.—Commended as useful tools of ingenious construction.

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9. **Western File Works, Beaver Falls, Pa., U. S.**

FILES AND RASPS.

Report.—Commended as well-cut and handsome goods.

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10. **Fisher & Norris, Eagle Anvil Works, Trenton, N. J., U. S.**

ANVILS AND VISES.

Report.—The anvils are commended as being of excellent quality.

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11. **McCaffrey & Brother, Philadelphia, Pa., U. S.**

HAND-CUT FILES AND RASPS.

Report.—Commended for a large variety of superior goods.

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12. **G. & H. Barnett, Black Diamond Works, Philadelphia, Pa., U. S.**

HAND-CUT FILES AND RASPS.

Report.—Commended as very superior goods.

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13. **The Douglass Manufacturing Co., Seymour, Conn., U. S.**

CHISELS, AUGERS, AUGER-BITS, AND DRAW-KNIVES.

Report.—Commended as very fine goods, highly finished, and of superior workmanship.

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14. **A. G. Coes & Co., Worcester, Mass., U. S.**

SCREW WRENCHES.

Report.—Commended as first-class goods and low in price.

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15. **American Saw Co., Trenton, N. J., U. S.**

MILL AND CROSS-CUT SAWS.

Report.—Commended as well finished and well adapted for use.

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16. **Edward H. Knight, Philadelphia, Pa., U. S.**

PATENT WRENCH (ADJUSTABLE).

Report.—Commended as a very useful and labor-saving invention.

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17. **J. M. Carpenter, Pawtucket, R. I., U. S.**

STOCKS WITH TAPS AND DIES.

Report.—Commended as extremely well finished.

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18. **Quaker City Stencil Works, Philadelphia, Pa., U. S.**

CAST LETTERS, SIGNS, AND BADGES.

Report.—Commended as very neat designs and well executed.

19. **S. H. Quint & Son, Philadelphia, Pa., U. S.**

STENCILS AND PATTERN LETTERS.

Report.—A great variety of excellently well-made articles.

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20. **Clough & Williamson, Newark, N. J., U. S.**

WIRE CORKSCREWS.

Report.—Commended as strong, durable, well-made, and cheap goods.

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21. **Limet-Lapareillé & Co., Paris, France.**

FILES AND RASPS.

Report.—Commended as of excellent quality and well adapted for intended purpose.

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22. **A. de Lambert, Liége, Belgium.**

WATCHMAKERS' AND JEWELERS' TOOLS.

Report.—Commended as showing great precision of workmanship, especially in file-cutting.

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23. **W. F. Palmer, San Francisco, Cal., U. S.**

SHIP-CARPENTERS', HOUSE-CARPENTERS', COOPERS', AND BUTCHERS' EDGE TOOLS.

Report.—Commended as good serviceable tools and substantially made.

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24. **George Leykauf, Nuremberg, Germany.**

BURNISHING STONES.

Report.—Commended as of high quality and finish.

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25. **R. & H. Vorster, Hagen, Germany.**

EDGE TOOLS.

Report.—Commended as of good design, finish, and quality, and moderate in price.

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26. **Wilhelm Eisenführ, Berlin, Germany.**

STOCKS, DIES, AND REAMERS.

Report.—Commended as good serviceable tools made by hand.

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27. **J. Marc Servet, Son, Geneva, Switzerland.**

TOOLS AND INSTRUMENTS FOR WATCHMAKERS.

Report.—Commended as very creditable in workmanship, especially in correctness of the file-cutting.

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28. **Sl. Vautier & Sons, Carouge, near Geneva, Switzerland.**

WATCHMAKERS' AND JEWELERS' TOOLS.

Report.—Commended as of good quality and finish; files cut with great precision and beauty.

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29. **Dates Patent Steel Co., Toronto, Ontario, Canada.**

AXES AND EDGE TOOLS.

Report.—Commended as of excellent quality and styles.

30. **Middletown Tool Co., Middletown, Conn., U. S.**

PLANE IRONS.

Report.—Commended as of good quality and highly finished.

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31. **Bailey Tool Co., New York, N. Y., U. S.**

IRON PLANERS AND SPOKESHAVES.

Report.—Commended as well-made and well-finished goods.

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32. **Josiah King & Son, New York, N. Y., U. S.**

PLANES OF ALL VARIETIES.

Report.—Commended as of general good quality.

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33. **William Rose & Brothers, Philadelphia, Pa., U. S.**

BRICK, PLASTERING, AND MOULDERS' TROWELS.

Report.—Commended as first-class in every respect.

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34. **William Johnson, Newark, N. J., U. S.**

CARPENTERS' AND OTHER MECHANICS' TOOLS AND OTHER HARDWARE.

Report.—Commended as very serviceable tools.

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35. **Carr, Crawley, & Devlin, Philadelphia, Pa., U. S.**

BUILDING AND CABINET HARDWARE; ALSO BRASS AND MALLEABLE CASTINGS.

Report.—Commended as excellent and useful goods.

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36. **Ohio Tool Co., Columbus, Ohio, U. S.**

PLANES, BENCH-SCREWS, CHISELS, DRAW-KNIVES, AND PLANE-IRONS.

Report.—Commended as of good quality and well made.

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37. **D. Maydole & Co., Norwich, N. Y., U. S.**

HAMMERS OF ALL SIZES AND FOR ALL PURPOSES.

Report.—Commended as first-class in every respect.

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38. **The Collins Co., Hartford, Conn., U. S.**

AXES, HATCHETS, PICKS, ADZES, WRENCHES, AND CANE-KNIVES (MACHETES).

Report.—Commended as of best quality and finish.

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39. **Yerkes & Plumb, Philadelphia, Pa., U. S.**

HAND-AXES, HATCHETS, CLEAVERS, AND HAMMERS.

Report.—Commended as of superior quality.

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40. **Klein, Logan, & Co., Pittsburg, Pa., U. S.**

PICKS, MATTOCKS, STONE-HAMMERS, AND SLEDGES.

Report.—Commended as well-made goods.

41. **A. W. Crossman & Son, West Warren, Mass., U. S.**

CHISELS AND DRAW-KNIVES.

Report.—Commended as highly finished; also thoroughly well made.

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42. **The Douglas Axe Manufacturing Co., East Douglass, Mass., U. S.**

AXES, HATCHETS, PICKS, AND ADZES.

Report.—Commended as being all first-class goods.

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43. **Henry Seymour & Co., New York, N. Y., U. S.**

MALLEABLE SHEARS AND SCISSORS (STEEL LINED).

Report.—Commended as of good quality; also well finished.

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44. **Alfred J. Colton, Philadelphia, Pa., U. S.**

PLANES.

Report.—Commended as of excellent quality and superior workmanship.

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45. **United States Steel Shear Co., West Meriden, Conn., U. S.**

FORGED CAST-STEEL SHEARS AND SCISSORS.

Report.—Commended as excellent goods.

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46. **Leonard Bailey & Co., Hartford, Conn., U. S.**

IRON PLANES, TRY-SQUARES, AND BEVELS.

Report.—Commended as of excellent quality and finish.

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47. **George Selsor & Co., Philadelphia, Pa., U. S.**

HAMMERS, HATCHETS, HAND-AXES, AND BOX COFFEE-MILLS.

Report.—Commended as of uniform good quality; also finely finished.

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48. **Harrison & Kellogg, Troy, N. Y., U. S.**

CASTINGS OF MALLEABLE IRON AND SCREW WRENCHES.

Report.—Commended as very smooth and of excellent quality.

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49. **W. C. Allison & Co., Philadelphia, Pa., U. S.**

PATENT COUPLING FOR IRON PIPES, ESPECIALLY FOR OIL WELLS.

Report.—Commended as having a vanishing screw, which permits a bearing at all points without weakening the tube.

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50. **Job T. Pugh, Philadelphia, Pa., U. S.**

AUGERS, BITS, AND FLOUR-TRIERS.

Report.—Commended as of very superior quality in every respect.

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51. **Alexander Krumbhaar, Philadelphia, Pa., U. S.**

HAND-CUT FILES AND RASPS.

Report.—Commended as well cut and of excellent quality.

52. **Sandusky Tool Co., Sandusky, Ohio, U. S.**

CARPENTERS', JOINERS', AND WOOD-TURNERS' TOOLS.

Report.—Commended as of the very highest quality and finish.

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53. **De Witt, Morison, & Kelley, Philadelphia, Pa., U. S.**

AUGERS, AUGER-BITS, AND FLOUR-TRIERS.

Report.—Commended as first-quality in all respects.

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54. **The D. K. Miller Lock Co., Philadelphia, Pa., U. S.**

SELF-LOCKING PADLOCKS.

Report.—Commended as very fine in every particular.

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55. **The Davis Level and Tool Co., Springfield, Mass., U. S.**

LEVELS AND PLUMBS.

Report.—Commended as of superior quality and finish.

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56. **Snell Manufacturing Co., Fiskdale, Mass., U. S.**

AUGERS, AUGER-BITS, AND BORING-MACHINES.

Report.—Commended as of very superior quality and finish.

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57. **The Langdon Mitre Box Co., Miller's Falls, Mass., U. S.**

MITRE-BOXES WITH FIXED SAWS.

Report.—Commended as exceedingly well-made and useful tools, and adjustable to any angle.

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58. **Hart, Bliven, and Mead Manufacturing Co., Kensington, Conn., and New York, N. Y., U. S.**

BUILDING AND HOUSEHOLD HARDWARE, FURNITURE TRIMMINGS, AND CARPENTERS' TOOLS

Report.—Commended for the great range of varieties and excellent quality and finish.

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59. **Peter Robertson, Ottawa, Ontario, Canada.**

LUMBERMEN'S AND STONECUTTERS' TOOLS.

Report.—Commended as of good quality and serviceable tools.

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60. **Thomas Moore, Cooksville, Ontario, Canada.**

AXE AND TOOL HANDLES.

Report.—Commended as of excellent material and well made.

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61. **R. H. Smith & Co., St. Catherines, Ontario, Canada.**

SAWS.

Report.—Commended for the good quality and finish of their exhibit of mill, cross-cut, circular, and other heavy saws; also for their hand-saws, buck-saws, and trowels.

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62. **Spiller Bros., St. John, New Brunswick, Canada.**

EDGE TOOLS.

Report.—Commended for quality and finish.

63. **J. E. Straus & Co., Philadelphia, Pa., U. S.**

GALVANIZED HODS, CHAINS, AND NAILS.

Report.—Commended as excellently well done.

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64. **Fagersta Iron and Steel Works, Fagersta, Westanfors, Sweden.**

MILL, CROSS-CUT, CIRCULAR, AND PIT SAWS AND STONE-HAMMERS.

Report.—Commended as of good quality and finish, and made of Bessemer steel.

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65. **Joseph Warnock & Co., Galt, Ontario, Canada.**

AXES AND EDGE TOOLS FOR WOOD, IRON, AND STONE.

Report.—Commended as of excellent design and superior workmanship.

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66. **Ahearn & Walsh, Ottawa, Canada.**

LUMBERMEN'S TOOLS.

Report.—Commended as of good quality.

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67. **Jacques Le Coultre, Sentier, Switzerland.**

RAZORS.

Report.—Commended as of very excellent quality.

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68. **William Wilkinson & Sons, Sheffield, England.**

SHEEP SHEARS AND GARDEN SHEARS.

Report.—Commended as of first quality and finish.

---

69. **Mayer & Meltzer, London, England.**

POCKET KNIVES, SCISSORS, AND RAZORS.

Report.—Commended as of good quality and finish.

---

70. **Wilson Hawksworth, Ellison, & Co., Sheffield, England.**

POCKET AND TABLE CUTLERY, SCISSORS, BUTCHERS' KNIVES, STEELS, AND CHISELS; MANUFACTURED STEEL FILES AND WIRE.

Report.—Commended as excellent in quality; manufactured goods well finished and of desirable description.

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71. **Brookes & Crookes, Sheffield, England.**

POCKET KNIVES, SCISSORS, RAZORS, AND TABLE KNIVES.

Report.—Commended as of elegant finish.

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72. **George Wostenholm & Son (Limited), Sheffield, England.**

POCKET KNIVES, RAZORS, AND SCISSORS.

Report.—Commended as unsurpassed in quality, finish, and beauty of style.

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73. **A. S. Whiting Manufacturing Co., Oshawa, Ontario, Canada.**

FORKS, HOES, SCYTHES, AND STRAW-KNIVES.

Report.—Commended as of the highest quality; also patterns and finish highly commended.

74. **J. B. Addis & Sons, Sheffield, England.**

CARVERS' TOOLS.

Report.—Commended as of superior finish and design.

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75. **James Burnand & Co., Sheffield, England.**

FINE CUTLERY, TABLE AND POCKET KNIVES, AND HUNTING KNIVES.

Report.—Commended as of excellent quality and finish.

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76. **Star Manufacturing Co., Halifax, Nova Scotia.**

SKATES.

Report.—Commended as of excellent quality and finish.

---

77. **John Russell Cutlery Co., Turner's Falls, Mass., U. S.**

TABLE CUTLERY, BUTCHER, HUNTING, PAINTERS', AND DRUGGISTS' KNIVES.

Report.—Commended as unsurpassed in quality and finish; also for beauty of design.

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78. **Miller Brothers Cutlery Co., West Meriden, Conn., U. S.**

POCKET KNIVES.

Report.—Commended as good in quality and finish.

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79. **L. Herder & Son, Philadelphia, Pa., U. S.**

MALLEABLE TAILORS' SHEARS AND SCISSORS.

Report.—Commended as good, serviceable goods.

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80. **The Lamson & Goodnow Manufacturing Co., Shelburne Falls, Mass., U. S.**

TABLE CUTLERY, COOKS' AND BUTCHERS' KNIVES.

Report.—Commended as excellent goods; also elegantly finished.

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81. **Howard W. Shipley, Philadelphia, Pa., U. S.**

POCKET KNIVES.

Report.—Commended as excellent in quality.

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82. **Herrmann Goldschmidt, New York, N. Y., U. S**

RAZOR STROPS OF RUSSIA LEATHER.

Report.—Commended as of excellent quality.

---

83. **Achille Parise, Son, Naples, Italy.**

A KEYLESS LOCK FOR SAFES AND STORE DOORS.

Report.—Commended, 1st, as showing very considerable inventive merit, and mechanical skill in construction; 2d, as cheap in cost of production.

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84. **G. W. Nock, Penn Lock Works, Philadelphia, Pa., U. S.**

PADLOCKS AND CAR PADLOCKS.

Report.—Commended as strong and well-made goods; the bell capable of sustaining severe blows without injuring the working of the lock.

85. **W. T. & J. Mersereau, New York, N. Y., U. S.**

STAIR RODS AND DOG COLLARS AND MUZZLES.

Report.—Commended as of good quality and tasteful designs.

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86. **A. Field & Sons, Taunton, Mass., U. S.**

IRON AND COPPER TACKS AND NAILS.

Report.—Commended as of excellent quality in every respect.

---

87. **American Wire and Screw Nail Co., Covington, Ky., U. S.**

WIRE AND SCREW NAILS.

Report.—Commended as well made and of excellent quality.

---

88. **F. H. Evans, Brooklyn, N. Y., U. S.**

PATENT EXPANSION BOLTS.

Report.—Commended as of good construction and substantially made.

---

89. **W. A. Ives & Co., New Haven, Conn., U. S.**

BRACES, AUGER HANDLES, TAP-BORES, AND AUGERS.

Report.—Commended as very superior in quality and finish.

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90. **A. G. Newman, New York, N. Y., U. S.**

BUCKMAN'S PATENT SPRING BUTTS, AND FRENCH FLAT INDICATORS.

Report.—Commended as ingenious, simple, and useful.

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91. **M. Gould's Sons, Newark, N. J., U. S.**

STAIR RODS AND DOG COLLARS.

Report.—Commended as handsomely finished and of tasteful style.

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92. **H. S. Shepardson & Co., Shelburne Falls, Mass., U. S.**

GIMLET BITS, REAMERS, GARDENERS' SETS, AND GOUGES.

Report.—Commended as superior tools, well made, and useful.

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93. **American Screw Co., Providence, R. I., U. S.**

IRON, BRASS, AND STEEL SCREWS, TIRE AND STOVE BOLTS, AND RIVETS.

Report.—Commended as of a quality nearly approaching perfection, showing the highest attainments in this branch of manufacture.

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94. **The Meriden Cutlery Co., Meriden, Conn., U. S.**

TABLE CUTLERY.

Report.—Commended as fine grades and beautifully finished.

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95. **R. Heinisch's Sons, Newark, N. J., U. S.**

TAILORS' SHEARS AND SCISSORS (MALLEABLE HANDLES).

Report.—Commended as of the best quality and finish.

96. **M. C. Mayo, Boston, Mass., U. S.**

BOSS PLANES AND ADJUSTABLE PLOWS.

Report.—Commended as good and well-finished tools.

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97. **Benjamin F. Badger & Son, Charlestown, Mass., U. S.**

RAZOR STROPS.

Report.—Commended as very superior in quality and finish.

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98. **Friedmann & Lauterjung, New York, N. Y., U. S.**

CONCAVE-GROUND RAZORS.

Report.—Commended as well finished and of good style and excellent quality.

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99. **P. Lowentraut, Newark, N. J., U. S.**

CALLIPERS, COMPASSES, HAMMERS, PUNCHES, AND SHOE-RASPS.

Report.—Commended as well-made and substantial goods.

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100. **Northfield Knife Co., Northfield, Conn., U. S.**

POCKET KNIVES.

Report.—Commended as beautiful in style and finish.

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101. **Elmira Nobles' Manufacturing Co., Elmira, N. Y., U. S.**

AXES, DRAW-KNIVES, AND AUGERS.

Report.—Commended as excellent in workmanship.

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102. **A. & I. Conard, Fort Washington, Pa., U. S.**

AUGERS AND BITS.

Report.—Commended as excellently-made goods.

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103. **J. Wiss, Newark, N. J., U. S.**

SHEARS, SCISSORS, SHOE-KNIVES, AND PRUNING SHEARS.

Report.—Commended as well finished and of excellent material.

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104. **Star Lock Works, Philadelphia, Pa., U. S.**

PAD AND TRUNK LOCKS AND DOOR-SPRINGS.

Report.—Commended as of excellent quality and handsomely finished.

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105. **Barney & Berry, Springfield, Mass., U. S.**

SKATES.

Report.—Commended as of beautiful patterns and elegantly finished.

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106. **Clarke Combination Lock Co., Baltimore, Md., U. S.**

U. S. SEAL PADLOCKS AND SAFE-DEPOSIT LOCKS.

Report.—Commended as excellent in quality and well adapted for popular use.

107. **Wilson Bohannan, Brooklyn, N. Y., U. S.**

PAD AND RIM LOCKS.

Report.—Commended as well finished, good, and substantial.

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108. **The Star Tool Co., Middletown, Conn., U. S.**

SQUARES, BEVELS, CALLIPERS, GAUGES, AND MACHINISTS' TOOLS.

Report.—Commended as finely finished, excellent in workmanship, and scales accurately marked.

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109. **Smith & Egge, Bridgeport, Conn., U. S.**

GOVERNMENT PADLOCKS, MORTISE LOCKS, AND SAFETY CHAINS.

Report.—Commended as strongly made and superior in every respect.

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110. **D. M. Meeker & Son, Newark, N. J., U. S.**

MALLEABLE IRON AND OTHER CASTINGS.

Report.—Commended as excellent in quality and finish.

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111. **Charles Buck, Millbury, Mass., U. S.**

FIRMER CHISELS AND GOUGES, PLANE IRONS, AND DRAW-KNIVES.

Report.—Commended as good materials and admirably well finished.

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112. **Romer & Co., Newark, N. J., U. S.**

BRASS AND IRON PADLOCKS AND RIM LOCKS.

Report.—Commended as beautiful and well gotten-up goods.

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113. **Eagle Lock Co., Terryville, Conn., U. S.**

TILL, CUPBOARD, AND OTHER LOCKS.

Report.—Commended as superior in quality of workmanship.

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114. **Will & Finck, San Francisco, Cal., U. S.**

TABLE CUTLERY.

Report.—Commended as substantial and well-finished goods; also tasteful in patterns.

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115. **American File Co., Pawtucket, R. I., U. S.**

MACHINE-MADE FILES AND HAND-CUT RASPS.

Report.—Commended as well made and excellent in quality.

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116. **Holley Manufacturing Co., Lakeville, Conn., U. S.**

POCKET CUTLERY.

Report.—Commended as excellent in styles and finish.

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117. **Kaliakin & Sons, Pavlovo, Nijni Novgorod, Russia.**

TABLE AND POCKET CUTLERY, SHEARS, AND PRUNING KNIVES.

Report.—Commended as highly finished, of excellent quality, and tasteful designs.

118. **Globe Nail Co., Boston, Mass., U. S.**

HORSESHOE NAILS.

Report.—Commended as uniform in size, smooth in finish, and excellent in quality.

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119. **Demetrius Kondratof, Vatch, Wladimir, Russia.**

TABLE, POCKET, AND OTHER CUTLERY.

Report.—Commended as of common class but excellent quality, and moderate in price.

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120. **A. Halling, Eskilstuna, Sweden.**

HUNTING KNIVES, KITCHEN KNIVES, AND DIRKS.

Report.—Commended as excellent in quality and finish.

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121. **F. M. Söderen, Eskilstuna, Sweden.**

SCISSORS AND SHEARS.

Report.—Commended as remarkably well finished and of good quality.

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122. **J. F. Lindström, Eskilstuna, Sweden.**

CUTTING NIPPERS, PLYERS, PINCERS, AND SHOE-PUNCHES.

Report.—Commended as of excellent quality and finish.

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123. **T. Hessenbruch & Co., Ronsdorf, Germany.**

TOOLS AND SCISSORS.

Report.—Commended as of good quality, well made and finished.

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124. **F. Wellmann, Altona, Germany.**

CUTLERY.

Report.—Commended as good in quality, well designed, and of moderate prices.

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125. **B. & O. Liberg, Rosenfors, Sweden.**

SHEARS, SCISSORS, CHISELS, PLANE-IRONS, GOUGES, AND SKATES.

Report.—Commended as of good quality, well finished, and moderate in prices.

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126. **F. S. Höller & Co., Solingen, Germany.**

CUTLERY.

Report.—Commended as of excellent quality and in great variety of styles and patterns.

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127. **Heinrich Ottomar Friedrich, Beierfeld, near Schwarzenberg, Germany.**

TINNED IRON SPOONS AND FORKS.

Report.—Commended as well made.

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128. **Heinrich Böker & Co., Solingen, Germany.**

CUTLERY.

Report.—Highly commendable on account of beauty of patterns, very high finish, and well-set edges, and at moderate prices.

129. **Alexis Zavialof, Vorsma, Nijni Novgorod, Russia.**

TABLE AND POCKET CUTLERY, SHEARS, AND HEAVY PRUNING KNIVES.

Report.—Commended as very highly finished, of excellent quality and desirable patterns.

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130. **Thinet, Paris, France.**

CUTLERY.

Report.—Commended as of good quality and at low prices.

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131. **Sommelet, Courcelles, France.**

CUTLERY.

Report.—Made at a reformatory school of juvenile offenders: of value as showing excellence under the circumstances.

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132. **Guillemin-Renaut, Nogent, France.**

CUTLERY.

Report.—Commended as well finished and commendable in taste and design.

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133. **J. Charbonné-Thuillier, Nogent, France.**

SCISSORS AND SHEARS.

Report.—Commended as of good workmanship and excellent quality.

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134. **Thomachot-Thuillier, Nogent, France.**

SHEARS.

Report.—Commended as of excellent quality.

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135. **H. Denizet, Langres, France.**

SHEARS AND KNIVES.

Report.—Commended as of good quality and moderate in prices.

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136. **A. Gallais, Paris, France.**

UPHOLSTERERS' NAILS.

Report.—Commended as well finished and of a great variety of good styles.

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137. **Empire of Brazil Exhibits.**

ORNAMENTAL CASTINGS, BOLTS, NUTS, AND WROUGHT-IRON WORK.

Report.—Commended as creditable to the exhibitors.

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138. **The J. L. Mott Iron Works, New York, N. Y., U. S.**

FOUNTAINS, VASES, AND STATUARY.

Report.—Commended as superior in design and quality.

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139. **J. F. Armbruster, Philadelphia, Pa., U. S.**

CASTING MADE FROM TIN WASTE.

Report.—Commended as a new industry, converting into practical use what has heretofore been considered of no value.

140. **E. Mills & Co., Philadelphia, Pa., U. S.**

BRACE-BITS, SAW-PADS, SCREW-DRIVERS, SPOKE-SHAVES, AND BRUSH-BITS.

Report.—Commended as all of the best quality and finish.

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141. **W. J. Flanagin & Co., Philadelphia, Pa., U. S.**

WRENCHES, NAMED "SAMSON WRENCHES."

Report.—Commended as a very simple yet valuable invention.

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142. **Stanley G. Flagg & Co., Philadelphia, Pa., U. S.**

STEEL, GRAY IRON, AND MALLEABLE CASTINGS.

Report.—Commended as a fine display of excellent castings. The steel castings are of superior quality.

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143. **Post & Co., Cincinnati, Ohio, U. S.**

PADLOCKS, CAR AND DOOR LOCKS, AND HINGES.

Report.—Commended as excellent in quality, carefully fitted, and well adapted for use.

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144. **J. H. Sternbergh, Reading, Pa., U. S.**

BOLTS AND NUTS.

Report.—A large assortment of sizes and patterns of very good quality.

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145. **Morse Twist Drill and Machine Co., New Bedford, Mass., U. S.**

SCREW PLATES, WRENCHES, STOCKS, DIES, AND CHUCKS.

Report.—Specially commended for accuracy and superiority of finish.

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146. **W. C. Allison & Co., Philadelphia, Pa., U. S.**

BOLTS, NUTS, AND SCREWS.

Report.—A great variety of very superior goods in all respects.

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147. **Hoopes & Townsend, Philadelphia, Pa., U. S.**

BOLTS, NUTS, SCREWS, AND RIVETS.

Report.—Commended as of excellent workmanship and quality of material.

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148. **Pennsylvania Tack Works, Norristown, Pa., U. S.**

TACKS AND SHOE NAILS (COPPER AND IRON).

Report.—Commended as most excellent goods.

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149. **C. Carmoy, Paris, France.**

UPHOLSTERERS' AND DECORATORS' NAILS AND ORNAMENTS.

Report.—Commended as excellent in design and finish.

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150. **Louis Roehle, Dresden, Germany.**

KNOBS AND DOOR TRIMMINGS.

Report.—Commended as very beautiful in design and finish.

151. Royal Manufactory of Spain, Madrid, Spain.

SPECIMENS OF LOCKS, HINGES, AND ESCUTCHEONS.

Report—Commended as beautifully finished and of antique styles and curious workmanship.

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152. E. & G. Brooke, Birdsboro', Pa., U. S.

NAILS, BRADS, AND SPIKES.

Report.—Commended as neatly made and of good quality and well proportioned.

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153. Dunbar, Hobart, & Whidden, South Abington, Mass., U. S.

TACKS, TRUNK AND CLOUT NAILS, HEEL AND TOE PLATES.

Report.—Commended as well made and of good quality.

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154. J. B. Shannon, Philadelphia, Pa., U. S.

BUILDING HARDWARE AND GONGS.

Report.—Commended as finely finished goods.

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155. Wheeling Hinge Co., Wheeling, W. Va., U. S.

WROUGHT BUTTS, STRAP AND T-HINGES, HASPS, AND STAPLES.

Report.—Commended as of good quality and highly finished.

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156. Scovill Manufacturing Co., Waterbury, Conn., U. S.

BRASS BUTTS AND HINGES, PIANO HINGES, AND CASTORS.

Report.—Commended as highly finished and artistic in patterns.

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157. Union Steel Screw Co., Cleveland, Ohio, U. S.

WOOD SCREWS, MADE FROM BESSEMER STEEL.

Report.—Commended as of excellent quality and workmanship.

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158. Trenton Lock and Hardware Co., Trenton, N. J., U. S.

RIM, MORTISE, PAD, TILL, CAR, AND SAFE LOCKS.

Report.—Commended as of superior quality and workmanship.

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159. Norwalk Lock Co., South Norwalk, Conn., U. S.

LOCKS, BOLTS, AND KNOBS, WINDOW AND DOOR FITTINGS.

Report.—Commended as excellent in quality, also in finish.

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160. Samuel Chatwood, London, England.

FIRE AND BURGLAR PROOF SAFES.

Report.—Commended as well made and of good materials.

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161. Stafford Manufacturing Co., New York, N. Y., U. S.

STENCIL COMBINATIONS AND KEY RINGS.

Report.—Commended as of good quality and well made.

162. **Union Manufacturing Co., New Britain, Conn., U. S.**

BUTT HINGES.

Report.—Commended as finely finished.

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163. **Gaylord Manufacturing Co., Chicopee, Mass., U. S.**

CABINET, TILL, AND CHEST LOCKS.

Report.—Commended as of excellent quality, and well finished.

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164. **Mallory, Wheeler, & Co., New Haven, Conn., U. S.**

RIM AND MORTISE DOOR LOCKS, LATCHES, PADLOCKS, AND DOOR KNOBS.

Report.—Commended as very superior goods, fine in finish, and tasteful in design.

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165. **D. R. Barton Tool Co., Rochester, N. Y., U. S.**

CHISELS, DRAW-KNIVES, AXES, HATCHETS, AND PLANES.

Report.—Commended as good in quality and finish.

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166. **Hotchkiss Sons, Bridgeport, Conn., U. S.**

CURRY-COMBS, ANIMAL TRAPS, BREAST DRILLS, AND SAW-SETS.

Report.—Commended as excellent in quality, and desirable in patterns.

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167. **Blake Bros. Hardware Co., New Haven, Conn., U. S.**

BUTTS, DOOR HANDLES, PULLEYS, AND CASTORS.

Report.—Commended as of excellent quality and finish.

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168. **The Branford Lock Works, Branford, Conn., U. S.**

RIM AND MORTISE LOCKS, LATCHES, AND DOOR KNOBS.

Report.—Commended as of good quality and well adapted for general use.

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169. **Lloyd, Supplee, & Walton, Philadelphia, Pa., U. S.**

JAIL AND SPRING PADLOCKS, HOLLOW AUGERS, AND FLUTING MACHINES.

Report.—Commended as superior goods.

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170. **S. R. Foster & Son, St. John, New Brunswick, Canada.**

NAILS, TACKS, AND BRADS.

Report.—Commended as well-made and fair merchantable goods.

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171. **Pillow, Hersey, & Co., Montreal, Quebec, Canada.**

NAILS, TACKS, BRADS, AND HORSESHOES.

Report.—Commended as of superior quality.

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172. **G. Gilmore, Côte St. Paul, Quebec, Canada.**

AUGERS AND BITS.

Report.—Commended as of superior style and finish.

173. Patent Nut and Bolt Co., near Birmingham, England.

BOLTS, NUTS, SPIKES, WRENCHES, CLINCH RINGS, AND WASHERS.

Report.—Commended as of excellent material and workmanship.

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174. Ward & Payne, Sheffield, England.

CHISELS, BRACES AND BITS, CARVERS' TOOLS, AND SHEEP SHEARS.

Report.—Commended as of excellent quality and well finished.

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175. William Baker, London, England.

TURNSCREWS, BITS, AND MATTRESS AND BALING NEEDLES.

Report.—Commended for excellent quality and good styles.

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176. Christopher Baker & Sons, Birmingham, England.

COFFIN TRIMMINGS AND DOOR FITTINGS.

Report.—Commended as well-finished goods.

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177. William Smith & Sons, Warrington, England.

PLIERS, NIPPERS, VISES, AND DIVIDERS.

Report.—Commended as well-made and serviceable tools.

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178. Sargent & Greenleaf, New York, N. Y., U. S.

COMBINATION, TIME, AND OTHER LOCKS.

Report.—The time locks are simple and effective, and are an absolute lock-out to every one until the expiration of the time for which they are set. Their winding is accomplished by the act of setting the mechanism to the hour of unlocking. The combination and other locks are well and strongly made and finely finished.

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179. Buck Brothers, Millbury, Mass., U. S.

FIRMER AND SOCKET CHISELS, PLANE-IRONS, AND PUNCHES.

Report.—Commended as fine in quality and beautifully finished.

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180. John Booth & Son, Philadelphia, Pa., U. S.

BRACES AND BITS, SPOKESHAVES, TURNSCREWS, AND CHAIR BITS.

Report.—Commended as of the best quality and finish.

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181. Penn Galvanic Works (F. & P. F. Chase), Philadelphia, Pa., U. S.

GALVANIZED SHIP HARDWARE.

Report.—Commended as work excellently well done.

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182. Van Heukelom & Verweij, Utrecht, Netherlands.

NUTS, BOLTS, AND SPIKES.

Report.—Commended as of very good quality.

183. **Lesjöfors Iron and Steel Co., Långbanshyttan, Sweden.**

WIRE NAILS, BRADS, AND TACKS.

Report.—Commended as of very superior quality.

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184. **F. A. Stenman, Eskilstuna, Sweden.**

LOCKS, LATCHES, AND BOLTS.

Report.—Commended as of fine finish and quality.

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185. **Riverside Iron Works, Wheeling, W. Va., U. S.**

CUT NAILS.

Report.—Commended as neatly shaped, well cut, and of good material.

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186. **L. Sykes & Son, Philadelphia, Pa., U. S.**

NUTS, BOLTS, TURNBUCKLES, AND WASHERS.

Report.—Commended as excellent goods and well made.

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187. **P. & N. Nicaise, Marcinelle, near Charleroi, Belgium.**

BOLTS AND RIVETS.

Report.—Commended as of excellent quality and finish.

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188. **Adolphe Fix, Molenbeek-Saint-Jean, near Brussels, Belgium.**

IRON AND BRASS NAILS.

Report.—Commended as of excellent quality.

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189. **W. & J. Tiebout, New York, N. Y., U. S.**

SHIP HARDWARE (BRASS AND IRON).

Report.—Commended as superior goods and of excellent patterns.

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190. **John J. Tower, New York, N. Y., U. S.**

PRISON LOCKS, PADLOCKS, WRENCHES, AND PLANES.

Report.—Commended as of excellent quality and very finely finished.

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191. **American Stair Rod Co., New York, N. Y., U. S.**

STAIR RODS AND FASTENING NAILS.

Report.—Commended as of good quality and tasteful design.

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192. **William Russell, Cincinnati, Ohio, U. S.**

HORSESHOES, HAND AND MACHINE MADE; ALSO HORSESHOE IRON.

Report.—Commended for a variety of shoes remedying defects in hoofs; also patent rolled iron for hand shoemaking. All highly meritorious.

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193. **Rhode Island Horseshoe Co., Providence, R. I., U. S.**

PATENT MACHINE-HAMMERED HORSESHOES.

Report.—Commended for a large variety of sizes of horse, mule, and snow shoes, manufactured from selected scraps; also good shape and finish.

194. **Wm. E. Quigley, Waterbury, Conn., U. S.**

HORSESHOES.

Report.—Commended as of excellent quality and finish.

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195. **Aaron W. Smith, Manchester, N. H., U. S.**

FLEXIBLE HORSESHOES (PATENT).

Report.—A valuable invention of much practical service.

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196. **S. S. Putnam & Co., Neponset, Mass., U. S.**

HORSE NAILS.

Report.—A large exhibit of good, well-made nails; superior quality.

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197. **National Horse Nail Co., Vergennes, Vt., U. S.**

HORSE NAILS.

Report.—Plain and polished, excellently well made, and of good material.

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198. **Benedict & Burnham Manufacturing Co., Waterbury, Conn., U. S.**

ROLLED BRASS AND COPPER AND BRASS AND COPPER WIRE AND CHAINS.

Report.—Commended as very superior and elegant goods.

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199. **Holmes, Booth, & Haydens, Waterbury, Conn., U. S.**

BRASS AND COPPER (ROLLED AND WIRE) RIVETS AND TACKS.

Report.—Commended as superior and well-finished goods.

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200. **Lewis, Oliver, & Phillips, Pittsburg, Pa., U. S.**

WAGON HARDWARE, HINGES, AND BOLTS.

Report.—Commended as well made and of excellent quality.

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201. **Corliss Safe Co., Providence, R. I., U. S.**

BURGLAR PROOF SAFES.

Report.—This is a novel idea in safemaking, and intended to be burglar proof only. The outer shell is something more than hemispherical in form, of very strong iron, of great thickness (five inches cast in a chill). The inner portion is concentric with the outer, and hung in a crane on pivots, having a motion on its center, and horizontally, by which it can be turned to give access to its contents or reversed and brought forward by appropriate mechanism to position for locking. The junction between the two portions is made tight by a ground fit, leaving no chance of introducing any explosive or wedge, and is still further secured by an expanding packing ring or tongue, fitting into a corresponding groove in the outer shell. The lock is also exceedingly well protected against assault, being encased in a heavy burglar proof box attached to the inside of the safe. The metal of which the safe is composed is sufficiently thick and well chilled. Should the lock be forced off, communication is still impossible with the interior of the safe. This safe is radically different in construction and operation from those made for some years past, and offers security from violence, which entitles it to the highest commendation.

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202. **New Britain Bank Lock Co., New Britain, Conn., U. S.**

BANK, SAFE, SAFE-DEPOSIT, DRAWER, AND OTHER LOCKS.

Report.—This is a large exhibit, comprising the Isham Key Register, Pillard dial, and time locks, and locks for other purposes. The bank and time locks are fine specimens of workmanship. The other locks are very well made and finely finished.

203. Valentine & Butler Safe and Lock Co., New York, N. Y., U. S.

FIRE AND BURGLAR PROOF SAFES.

Report.—First-class work, well and strongly made. Provided with the usual protection against fire and burglary.

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204. B. Haffner, Sr., Paris, France.

SAFES AND JEWEL BOXES.

Report.—A full and fine exhibit of fire and burglar proof safes, house or plate safes, and jewel boxes, with combination locks and a time or chronometer lock. These safes, of which there are many specimens of different sizes, are exceedingly well made and fitted. The same may be said of the locks. The burglar proof safes are composed of alternate plates of wrought and hard cast iron, and would offer great resistance to the drill. The fire proof safes have combination locks and are filled with a non-conducting composition. The jewel cases and cash boxes are well made and finished. The plate safe is a model of taste in design and finish.

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205. Yale Lock Manufacturing Co., Stamford, Conn., U. S.

TIME, SAFE-DEPOSIT, PRISON, DOOR, CLOSET, AND DRAWER LOCKS, POST-OFFICE BOX AND LOCKS, DOOR TRIMMINGS, AND HINGES.

Report.—These are well-made, substantial goods; the better grades are very finely finished, and are well adapted to their intended purposes. The model post-office, together with the boxes and locks, are neat and tasteful in design, and a public convenience. The time locks are very fine specimens of workmanship, and possess every element of security and protection against being opened except at the stipulated time and by the proper person. The door knobs, handles, and trimmings are fine, well-made goods.

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206. Beard & Brothers, St. Louis, Mo., U. S.

BURGLAR AND FIRE PROOF SAFES (WITH SCREW DOOR).

Report.—The construction of this door affords a security which the square door does not. The safes are constructed of alternate plates of welded chrome steel and iron in the usual manner. The workmanship throughout is of excellent character. These safes have circular doors; are made of welded (chrome) iron and steel; the doors are closed by a screw, and the fit ground. As the door is admitted to be the weakest point in any safe, this circular form, ground fit, and screwed fastenings may be regarded as an additional security in comparison with the square or rectangular, single or double doors, and the screw securing the door being double threaded, one thread one-sixteenth pitch finer than the other, gives a close fit without much risk of jamming. These safes are worthy of notice for their burglar-proof qualities.

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207. Terwilliger & Co., New York, N. Y., U. S.

FIRE AND BURGLAR PROOF SAFES.—SPECIAL CLAIMS, BURGLAR PROOF SAFES, WELDED STEEL (THE OUTER PLATE OF STEEL), AND IRON REVOLVING BOLTS, DOORS TONGUED AND GROOVED AND PACKED WITH RUBBER OR FELT. THE FIRE PROOF SAFES FILLED WITH THE ORDINARY COMPOSITE FILLING.

Report.—Well constructed, substantially made, and of superior finish.

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208. J. Watson & Son, Philadelphia, Pa., U. S.

BANKERS', OFFICE, AND HOUSE SAFES; WELDED STEEL AND IRON, TONGUED AND GROOVED DOORS, AND REVOLVING BOLTS. FOR BURGLAR PROOF WORK. FOR FIRE PROOF SAFES FILLED WITH THE ORDINARY COMPOSITION.

Report.—The safes in the exhibit are well made and finished.

209. Marvin Safe and Scale Co., New York, N. Y., U. S.

FIRE AND BURGLAR PROOF SAFES.—BANKERS', OFFICE, AND HOUSE SAFES, JEWEL BOXES, AND COMBINATION LOCKS.

Report.—The burglar proofs are of welded steel and iron, and of the same general construction and arrangement of bolt works as many others, and are strong, well-finished work. The fire proof safes are filled with a fire proof composition, and are well finished and decorated. The safe-locks are good and very low in price. The house safes are very tastefully finished. There is also a spherical safe made of chrome iron.

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210. Herring & Co., New York, N. Y., U. S.

FIRE AND BURGLAR PROOF SAFES; BANKERS', OFFICE, AND HOUSE SAFES AND JEWEL BOXES; CHRONOMETRIC AND OTHER LOCKS.

Report.—Special claims: Patent filling for fire and burglar proof work; franklinite used in addition to welded steel and iron in construction; revolving bolts; doors and their opening tongued and grooved and packed with rubber; locks with or without chronometric attachment; detachable lever or stop securing the bolts in case the lock is forced. The time and safe locks are fine specimens of workmanship and afford protection against fraud. The burglar proof work is massive, and every precaution taken against fraud or violence. The office and house safes are very thoroughly made and decorated. The whole exhibit shows good taste and first-class workmanship.

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211. Farrell & Co., Philadelphia, Pa., U. S.

SAFE-DEPOSIT VAULT AND BANKERS', OFFICE, AND JEWELERS' SAFES.

Report.—The burglar proof made of welded steel and iron and franklinite is very strong and massive, with revolving bolts. The security of this safe consists in its three walls of an aggregate thickness of nine inches, each door secured by a combination lock, the outside one having a double chronometric lock. The safe-deposit vault is fitted up complete, and forms altogether the most extensive exhibit in the safe department. The fire proof safes are well made and finished, with combination locks, and are filled with concrete. Special commendation is given to the double fire proof safe, which is presumed to be in every respect what its name indicates.

SIGNING JUDGES OF GROUP XV.

The numbers annexed to the names of the Judges indicate the reports written by them respectively.

DANIEL STEINMETZ, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 23, 49, 51, 63, 64, 68, 82, 83, 88, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 120, 121, 122, 125, 137, 140, 141, 142, 143, 144, 145, 146, 147, 148, 151, 152, 153, 161, 181, 183, 184, 185, 186, 193, 194, 195, 196, 197, 198, 199, 200.

CHAS. STAPLES, JR., 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 79, 80, 81, 84, 85, 86, 87, 89, 90, 91, 92, 94, 95, 96, 97, 98, 99, 118, 138, 139, 154, 155, 156, 157, 158, 160, 179, 180, 189, 190, 191, 201, 203, 206, 207, 210, 211.

JOHN D. IMBODEN, 192.

G. L. REED, 45, 46, 47, 48, 50, 52, 53, 54, 55, 56, 57, 58, 77, 78, 93, 159, 162, 163, 164, 165, 166, 167, 168, 169, 202.

DAVID MCHARDY, 21, 22, 24, 25, 26, 27, 28, 29, 59, 60, 61, 62, 65, 66, 67, 69, 70, 71, 72, 73, 74, 75, 76, 119, 123, 124, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 149, 150, 170, 171, 172, 173, 174, 175, 176, 177, 178, 182, 187, 188, 204, 205, 208, 209.

SUPPLEMENT TO GROUP XV.

REPORTS

OF

JUDGES ON APPEALS.

JUDGES.

JOHN FRITZ, Bethlehem, Pa.
EDWARD CONLEY, Cincinnati, Ohio.
CHARLES STAPLES, JR., Portland, Me.
BENJ. F. BRITTON, New York City.
H. H. SMITH, Philadelphia, Pa.

COLEMAN SELLERS, Philadelphia, Pa.
JAMES L. CLAGHORN, Philadelphia, Pa.
HENRY K. OLIVER, Salem, Mass.
M. WILKINS, Harrisburg, Oregon.
S. F. BAIRD, Washington, D. C.

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1. Chr. Heljestrand, Eskilstuna, Sweden.

RAZORS, KNIVES, AND CORKSCREWS.

Report.—Commended for good workmanship and finish and good quality; made from Bessemer steel.

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2. Wm. Demuth & Co., New York, N. Y., U. S.

CAST ZINC AND OTHER FIGURES FOR TOBACCONISTS' AND OTHER SIGNS.

Report.—Commended for beauty and appropriateness of design and skill displayed in fabrication.

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3. Ira Buckman, Brooklyn, N. Y., U. S.

AUTOMATIC WINDOW LOCK.

Report.—Commended for simplicity, strength, and security.

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4. W. W. S. Orbeton, Wakefield, Mass., U. S.

SCREW BRACE, BLIND HINGES, AND SASH PULLEYS.

Report.—Commended as a strong, secure hinge, and the sash pulley convenient and well adapted to its intended purpose.

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5. Ausable Horse Nail Co., New York, N. Y., U. S.

HORSESHOE NAILS.

Report.—Commended for superior quality of iron used in this manufacture; nails well made.

6. Hall's Safe and Lock Co., Cincinnati, Ohio, U. S.

DEPOSIT VAULTS AND SAFES AND CHRONOMETRIC AND OTHER LOCKS.

Report.—Commended for fire proofs, as a patent prepared fire resistant; for burglar proofs, that they are built of alternate plates of welded iron and chrome steel, fastened together by conical bolts. They have interlocking bolts, chronometric attachments to locks, dovetail corners and doors, detachable handles, additional protection from fire of a composition-filled shutter over an air space inclosing the bolt work in the fire proof work. All the above are esteemed valuable improvements. The style and workmanship throughout are of the highest character as to finish and security. The safe-deposit vault is a strong and massive structure, and equal to any exhibited, with its doors well protected by heavy bolt work and combination locks.

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7. Metallic Art Works, Boston, Mass., U. S.

BRONZE CASTINGS, NAME PLATES, ETC.

Report.—Commended as fine specimens of castings, tasteful in design, and neatly finished.

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8. Stanley Works, New Britain, Conn., U. S.

WROUGHT IRON BUTTS AND HINGES; FLUSH AND OTHER BOLTS.

Report.—A great variety of styles of excellent quality, finish, and design, and embracing some useful improvements.

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9. Pottstown Iron Co., Pottstown, Pa., U. S.

CUT NAILS.

Report.—Commended for good quality of iron used and excellent workmanship.

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10. J. Neal & Co., London, England.

PATENT PYRO SILVER CUTLERY.

Report.—Commended for the thorough incorporation of the silver with the surface of the steel without the aid of an intervening coating of copper or any other metal, thereby increasing its durability and enabling it to resist injury by sharpening, and for the elegance of their finish and handling in agate and ivory.

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11. Colin Pullinger, Selsey, near Chichester, Sussex, England.

SELF-ACTING SIFTER, CASK STAND, AND MOUSE TRAPS.

Report.—A curious collection of very ingenious contrivances, covering a wide range of objects, showing very considerable inventive skill and good workmanship.

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12. G. Kent, London, England.

KNIFE-CLEANING MACHINES.

Report.—Commended for efficiency and adaptation to their intended purpose.

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13. Alois Winkler, Vienna, Austria.

CAST ZINC LETTERS, EMBLEMS, AND PLATES FOR DESIGNS.

Report.—Commended for good quality of the articles exhibited and tasteful designs.

14. **Hombok and Marienthal Ironware Industry and Trade Co., Moravia, Vienna, Austria.**

MACHINE-MADE NAILS.

Report.—Commended for general good quality and finish.

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15. **Joh. Engström, Eskilstuna, Sweden.**

RAZORS.

Report.—Commended for good workmanship and style, as well as for good quality of material used.

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16. **Beecher & Hildershein, Vienna, Austria.**

SAFETY LOCK ON THE KAPPERSDORF SYSTEM.

Report.—Commended for good workmanship and ingenuity of contrivance.

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17. **Koch & Bein, Berlin, Germany.**

CAST ZINC LETTERS, FIGURES, AND COAT OF ARMS.

Report.—Commended for the excellence of the castings and good taste displayed in their ornamentation and finish.

SIGNING JUDGES OF SUPPLEMENT TO GROUP XV.

The figures annexed to the names of the Judges indicate the reports written by them respectively.

CHARLES STAPLES, JR., 2, 3, 4, 6, 7, 8, 10, 12, 13, 14, 17.
COLEMAN SELLERS, 1, 5, 9, 11, 15, 16.