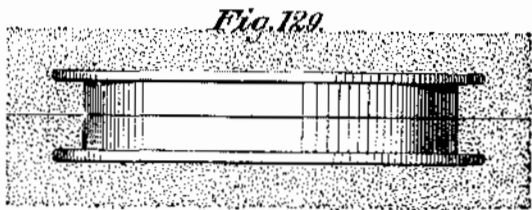
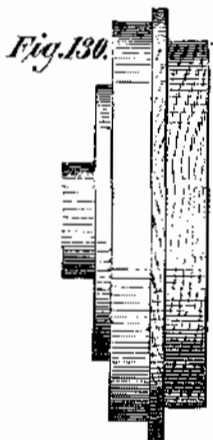


Our fourth example is a double flanged pulley, shown in section in Fig. 128; and our first consideration is how it shall be moulded. It evidently should lie in the sand in the position shown in Fig. 129; but it will be observed that the sand is confined between two flanges, rendering it practically impossible to retract the pattern from the mould, if it is made in one piece. We say, practically impossible, meaning that it cannot be done economically; for strictly speaking, an expert moulder with every requisite appliance, can mould almost anything, as any one will conclude who examines the various works of art in bronze which appear in art exhibitions and elsewhere. Our pattern must, for ease of moulding, be made in two parts. If the disc (or spokes, if it be a spoke-wheel) be sufficiently thick to allow it, the division may be made at the centre, that is to say, on the line A P, in Fig. 128. The operation of the moulder may be understood

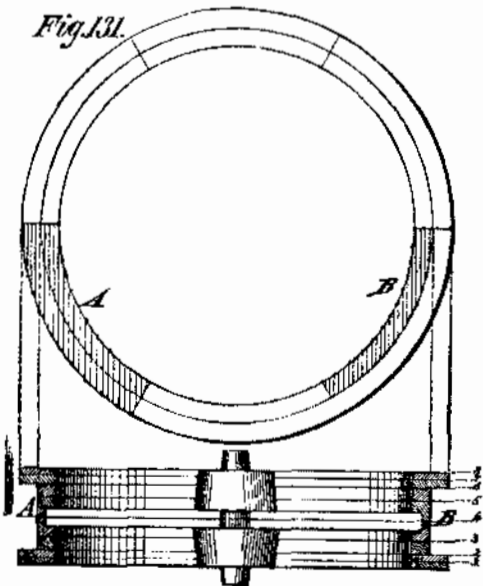


from Fig. 129, three distinct beds of sand being necessary. It may be that a part of a flash is used for each bed, or it may be arranged as shown in Fig. 129, it being a matter of indifference to the pattern maker. In either case, however, draught should be allowed both inside and outside, that is to say, both the interior and exterior diameters of the pattern should be made smallest at the line of parting, the diameters increasing slightly as they approach the flanges. The hubs also should, in like manner, be slightly tapered. Inside sharp corners should be avoided; they should, in fact, always be rounded by cutting them out with a round-nosed tool. To construct this pattern, we proceed as follows: For a small pattern, we take two pieces, somewhat thicker than half the thickness of the finished pattern, and large enough to allow for turning. We then chuck them, as shown in Fig. 130, and turn them up.



The recesses shown at the centre by the dotted lines, must be made of equal size in the halves of the pattern; and we prepare a chuck with a projection across the centre to fit into the recess, and thus rechunk the pieces and turn out the opposite sides, cutting the hubs out of the solid. We may then fit a plug into the recess in one half of the pattern, and glue it fast, allowing it to project so as to fit into the recess in the other half; and the pattern is complete, unless the hole in the hub is to be cored, in which case it will be necessary to fix core prints on the top and bottom, in the manner described in our first example.

A useful hint may here be given to the effect that when it is decided to fix prints in the centre of a piece of turned work, a slight recess may be made to receive the print, which is then sure to stand true; and should it at any time get accidentally knocked off, as prints often do, another may be immediately affixed without the trouble of finding the centre. The pattern now supposed to be made, though good enough for many purposes, has one great defect which will be readily perceived when we bear in mind our remarks on the properties of timber. It is that it will gradually become oval; and to avoid this, we must



have recourse to what is termed building up, a process which must in any event be used if the pattern is a large one. To build up such a pattern, we proceed as follows: After drawing the pulley in section and in plan, as shown in Fig. 131, we divide the whole height of the section into courses, the number of courses being regulated so as to have each of a convenient thickness. It is advisable, however, to have at least two courses in the flange, which will greatly increase its strength. After dividing one of the circles in the plan view into six parts, we draw lines from the points of division to the centre, as shown; and then we make a template of one

division, as shown at A, which must be made a little larger than the division, and this forms a template whereby to cut out the segments forming the courses which make up the flanges. A similar template, cut out somewhat larger than the space devoted to B, in Fig. 131, will serve to cut out the sections to be used in forming the body of the pattern. The flanges being made in two courses each, and there being six sections in each course, we shall require 26 pieces of the size of the large template; and allowing each half of the body likewise to consist of two courses, we shall require the same number, to form the body of the pattern, of the size of the small template.

**Heating City Houses by Main Pipes.**

A paragraph is going the rounds of the newspapers just now, stating that a very novel and at the same time interesting experiment is soon to be attempted in Lockport, N. Y., by Mr. Holly, the waterworks pump inventor. This experiment is to heat the whole city with steam, after the same manner as it is lighted with gas. Pipes are to run to the different houses, and all the occupant has to do is to turn on a faucet and obtain all the heat he wants.

But unfortunately for Mr. Holly, the idea of heating cities from furnaces is not new. It has been suggested a number of times by different persons, and if we mistake not, Mr. L. W. Leeds, author of a work on ventilation and an engineer, in this specialty, tried to organize a company for heating this city by hot air or steam from furnaces placed in different sections of the city and connecting the heat by pipes to our houses in the same way as water and gas are supplied.

**Artificial Butter.**

To the Editor of the Scientific American:

Owing to the receipt of much correspondence concerning my article on artificial butter, which appeared in the SCIENTIFIC AMERICAN SUPPLEMENT, N. Y., Nos. 48 and 49, I wish to state that I own no patent on the process. The only patent held is Mége's, which is owned by the United States Dairy Company, 6 New Church Street. All letters, therefore, should be forwarded to that address. The process I described in my article is simply an elaboration of that patented by Mége, and cannot be used without infringing on the United States Dairy Company's patent.

HENRY A. MOTT, JR., E.M., PH. D.

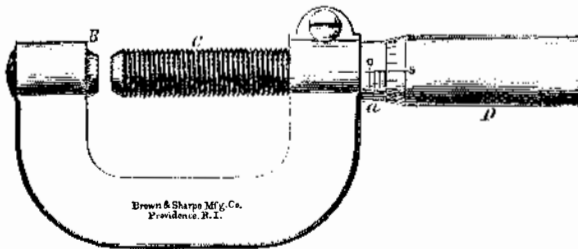
New York City.

**A New Use for Gun Cotton.**

A wad of old gun cotton, the staler the better, is reported by M. Jacquemin to be an excellent test object for adulteration of wine by fuchsin or orchil. If it be heated with the suspected wine for a short time, it becomes dyed if any foreign coloring matter be present. On moistening the wad with ammonia, if orchil be present, it turns violet; while the fuchsin dye, which cannot be washed out in water, slowly bleaches.

**A MICROMETER CALIPER.**

In the accompanying engraving we illustrate a valuable workshop tool, the utility of which, as a reliable and convenient substitute for the vernier caliper for all measurements less than one inch, will be at once apparent. The main piece of the caliper is bow-shaped, with a projecting shank *a*, into which is fitted the screw *c*, which is accurately cut with a thread of 40 pitch. The shank, *a*, has a line of graduations of same pitch as the screw, *c*. The hollow cap, *D*, which is firmly attached to the right hand end of the screw *c*, fits upon the outside of the shank, *a*. One revolution of this cap opens the caliper twenty-five thousandths of an inch. Parts of a revolution are shown on the line of graduations upon the circumference of the beveled end of the cap, *d*, the value of each graduation being one one-thousandth of an inch in the opening of the caliper. Thus, three whole turns and one fifth of a turn would equal eighty-one thousandths of an inch, inasmuch as three turns equal twenty-five thousandths, and one fifth of a turn (or five of the circular graduations) equal five one-thousandths, making altogether eighty-



one thousandths of an inch. Though graduated to read to thousandths of an inch, half and even quarter thousandths are easily obtained, and measurements are read without the use of a glass. It is provided with screws for adjustment and for holding it securely at any given size. Being made wholly of steel, all the parts are durable, the points of contact also being tempered. It is small, light, well adapted for use as a pocket tool, and will prove invaluable to the better class of machinists and fine tool makers. It is made by the Brown & Sharpe Manufacturing Company, of Providence, R. I.

**DYEING COCHINEAL RED ON FLANNEL.**—For 22 lbs. flannel, use 1 lb. 10 ozs. oxalic acid, 8½ ozs. tin crystals, 2 lbs. 3 ozs. cochineal, and ½ oz. flavin are boiled well together, cooled, the goods entered and winced till the desired shade is produced. If a blue tone is required, no flavin is added; but for yellow tones as much as 1½ oz. flavin may be used.

**ASTRONOMICAL NOTES.**

OBSERVATORY OF VASSAR COLLEGE.

The computations and some of the observations in the following notes are from students in the astronomical department. The times of risings and settings of planets are approximate, but sufficiently accurate to enable an ordinary observer to find the object mentioned. M. M.

**Positions of Planets for January, 1877.**

**Mercury.**

Mercury sets so much later than the sun in the early part of January that it will probably be seen in the twilight. On January 10, Mercury is at its greatest angular distance from the sun, and can be easily found, some degrees north of the point of sunset. On January 1, Mercury rises at 8h. 41m. A. M., and sets at 5h. 47m. P. M. On the 31st, Mercury rises at 7h. 29m. A. M., and sets at 4h. 28m. P. M.

**Venus.**

Venus must be looked for in the morning. On January 1, it rises at 5h. 11m. A. M., and sets at 2h. 34m. P. M. On the 31st, Venus rises at 6h. A. M., and sets at 3h. 10m. P. M.

**Mars.**

Although Mars differs from Venus only 1h. 22m. in right ascension, it rises more than 1h. 30m. before Venus, because it is in greater northern declination.

On January 1, Mars rises at 3h. 37m. A. M., and sets at 1h. 26m. P. M. On the 31st, Mars rises at 3h. 18m. A. M., and sets at 0h. 31m. P. M.

Mars is now very small, but it can be known among the stars by its being nearly in the same diurnal path with Venus, and about 20° west of that brilliant planet. Mars can also be known by its position relative to the bright star Antares. On January 24, Mars is a few degrees north of Antares.

**Jupiter.**

Jupiter can scarcely be seen at all. On January 1, it rises at 5h. 54m. A. M., and sets at 3h. P. M. On the 31st, it rises at 4h. 24m. A. M., and sets at 1h. 27m. P. M. On the 31st, Venus, Mars, and Jupiter can all be seen in the morning. Jupiter is the farthest south.

**Saturn.**

Saturn, which has been so well situated for evening observers during several months past, now comes to the meridian in the afternoon, and on January 1, is in the southwest when first seen, after sunset. On the 1st, Saturn rises at 10h. 22m. A. M., and sets at 8h. 58m. P. M. On the 31st, Saturn rises at 8h. 32m. A. M., and sets at 7h. 16m. P. M.

Low as it is, in the southwest, Saturn, even on January 31, can be seen with small telescopes. A telescope of two and a half inches object-glass will show the curious and wonderful ring, and the largest of its many moons.

**Uranus.**

On January 1, Uranus rises at 8h. 7m. P. M.; and as it is in good northern declination, it can be well seen by 10h. P. M. A telescope of small power will show it round, and like a very small full moon.

On January 31, Uranus rises at 6h. 3m. P. M., and comes to the meridian at 1h. A. M. When on the meridian, Uranus is almost exactly in a vertical line with the star *Mu Leonis*, and 12° below it. Uranus can also be found from the neighbourhood of the bright star Regulus. At the time of meridian of Regulus, Uranus is 5° west of, and 2° above that star.

**Neptune.**

Neptune's position is good, in the early evening, but only large telescopes will show it to any advantage.

On January 1, Neptune rises at 0h. 33m. P. M., comes to meridian at 7h. 21m. P. M., and sets at 1h. 55m. the next morning. On January 31, Neptune rises at 10h. 40m. A. M., and sets at 11h. 58m. P. M.

**Sun Spots.**

A remarkably large spot, followed by a very small one, and surrounded by faculae, is observed at the present date, December 17, just coming on.

For a very long time, from November 24 to December 17, the sun's disc has appeared to be free from spots, visible with a glass of two and a half inches aperture.

**BOTS.**

By PROFESSOR C. V. RILEY.

A correspondent, engaged in the tanning business, asks why "worms" get into the backs of cattle, and how they undergo their transformations.

Almost all cloven-footed animals, and many other herbivorous species, are infested with bots. These are legless grubs which fall into three categories: 1. Gastric, or those which are swallowed by the animal infested, and which live in the stomach in a bath of chyle. 2. Cervical, or those which crawl up the nostrils and inhabit the frontal sinuses. 3. Cutaneous, or those which dwell in tumors just beneath the skin. They are all the larvæ or early state of two-winged flies (diptera) belonging to the family *astriidae*, characterized by having the mouth parts entirely obsolete, and popularly called gad flies or bot flies. In the first series, of which the horse bot (*gastrophilus equi*) is the most familiar example, the eggs are attached by the female fly to the hairs of the body, and principally on those parts of the body within easy reach of the animal's mouth. The egg opens with a lid, and the young maggot upon hatching clings to the tongue as the animal licks itself, and is thus carried into the fore-stomach, to which it holds tenaciously by a series of spines around the body, but principally by a pair of sharp hooks at the head. When fully grown, they leave their post with the faeces, burrow in the ground and undergo the final transformation. In the second kind, of which the sheep bot (*astrius ovis*) will serve as an example, the egg generally hatches

within the body of the parent, and the young grub is deposited alive on the slimy nostrils of its victim. By means of a pair of long and sharp hooks at the head, and of bands of minute spines on the venter, the young grub works its way into the sinuses of the head, and when full grown permits itself to be sneezed out, when it also burrows in the ground and transforms. In the third kind, the parent lays the egg on those parts of the body which cannot well be reached by the mouth of the animal attacked, and the young grub, which soon hatches, burrows into the flesh and subsists upon the pus and diseased matter which results from the wound inflicted and the irritation constantly kept up. The well-known worm, or ox bot (*hypoderma bovis*) so common along the backs of our cattle, and especially of yearlings and two-year-olds, and dreaded as much by the tanner as by the animal it infests, is typical of this kind. Residing in a fixed spot, we no longer find in this species the strong hooks at the head, and the spines around the body are sparse and very minute: the parts of the mouth are soft and fleshy.

All these bot larvæ breathe principally through two spiracles placed at the blunt and squarely clocked end of the body, and in the ox bot these are very large and completely fill up the hole to the tumor in which the animal dwells. When ready to transform, it backs out of its residence, drops, and burrows into the ground, and there, like the other species, contracts and undergoes its final change to the fly. The eggs of this ox bot are elliptic-ovoid, slightly compressed, and have at the attached end a five-ribbed cap or stout stalk with which to strongly attach them to the skin of the back.

The gastric bots are best prevented by proper grooming of the horses to remove the eggs or nits from the fore legs and flanks. Horses, too, that are properly stabled and kept in the shade during the hotter summer months are less frequented by the parent fly. Scarcely any mode of drugging will dislodge the bots when once they are attached to the stomach, without injuring the parasitized animal. Cervical bots are also with difficulty dislodged except when they are full grown and ready to naturally let go their hold. Animals may, however, be measurably protected, by enabling them to smear their noses with tar, or by enabling them to bury their noses when the parent fly is seeking to deposit. This they will instinctively do if portions of their pastures be turned up and the ground kept loose. The cutaneous species may be removed by pressure of the thumb and finger, or destroyed by the application of kerosene. If removed while small, the wound in the skin heals up, and no hole will occur in the hide.

Manhattan, Kan.

#### Domesticating the Buffalo.

A correspondent of the *Turf, Field, and Farm* sends some interesting facts regarding the domestication of the buffalo in Nebraska. He began with two cows and a bull, which he kept with his tame stock. In the spring the cows calved, and in three years the calves became mothers, yielding an average of 14 quarts of the richest milk daily, for an average of five months. The buffalo strain now extends through a large part of Howard county, in the above State, and the half and quarter breed animals are found to be very hardy.

Our contemporary adds, that sufficient experiments have been made in crossing the buffalo with native and grade short horn cattle, and have been attended with such successful results that the most skeptical people cannot fail to be satisfied as to the advantages and value of the intermingling of breeds.

AMERICAN manufacturers of woodworking and other machinery, who desire to find a market for their products in Europe, are referred to the advertisement of B. Dambacher, of Hamburg, Germany, in another column.

#### NEW BOOKS AND PUBLICATIONS.

**CHAMBERS' ETYMOLOGICAL DICTIONARY OF THE ENGLISH LANGUAGE.** Edited by James Donald, F.R.G.S., etc., editor of Chambers' "English Dictionary," etc. London and Edinburgh: W. & R. Chambers. New York City: R. Worthington, 750 Broadway.

This very compendious volume is a complete dictionary of the English tongue, giving the etymology, pronunciation, and meanings of all the words. The derivations are evidently written by a scholar of the highest attainments, and the significations are given with the nicest discrimination, showing the wealth of the English language, which is, as Macaulay says, "less musical indeed than the languages of the South, but which is, for all the purposes of the poet, the philosopher, and orator, inferior to that of Greece alone." The simplicity and correctness of language in which the definitions are given, deserve praise, and the meanings of technical and scientific terms are made clear. The typography of this volume is excellent, and the book is of conveniently portable size.

**MANUAL OF THE RAILROADS IN THE UNITED STATES FOR 1876 AND 1877,** showing their Mileage, Cost, Traffic, Expenses, etc., with an Appendix showing the Debts of the United States and of the Several States. By Henry V. Poor. New York City: H. V. & H. W. Poor, 68 Broadway.

The nine hundred pages of this volume contain full accounts of the history and present condition of every railroad in this country, the collection and compilation of which indicates the extent of the labor which has been bestowed on the work. It is a book that will prove itself to be of the greatest value to investors, bankers, and capitalists.

**THE ATLANTIC MONTHLY.** Subscription price, \$4 a year. New York City: Hurd & Houghton, 13 Astor Place.

This established favorite with all lovers of high-class literature sends us a prospectus announcing several attractions for the coming year. Among the authors named are Messrs. Longfellow, Whittier, Holmes, Lowell, Stedman, Aldrich, Howells, Clemens (Mark Twain), C. F. Adams, Jr., and others. The introduction of original music into its pages will be a new feature of much interest and value; and the series of portraits, commenced last year by a likeness of Longfellow, will be continued by one, by the same author of W. C. Bryant. The *Atlantic* has been in existence for nineteen years, and an index for that period, covering the first thirty-eight volumes, is in preparation.

**SIMPLIFIED WEIGHTS AND MEASURES, on a Natural System Applicable to Most Civilized Nations.** By Louis D'A. Jackson, A.J.C.E., author of "An Hydraulic Manual," etc. Price, \$1. New York City: E. & F. N. Spon, 446 Broome Street.

The author of this work has, like many of his fellow laborers, an ease task before him in demonstrating the inconvenience of the weights and measures now in common use in English-speaking countries; but the difficulty of introducing a new one, however reasonable and harmonious in itself, he entirely fails to appreciate. The very little progress made by the French metric system, which is admirable as a theoretical scheme, and is practically successful in France and elsewhere, should convince advocates of a new method of the immense task that lies before them when they essay to assimilate the practice of all countries in the world. But we must admit that Mr. Jackson is an able and conscientious advocate of his ideas.

**AN INTRODUCTION TO QUALITATIVE ANALYSIS.** By F. Beilstein. Translated by I. J. Osborn. New York City: D. Van Nostrand, 23 Murray and 27 Warren Streets.

This useful little manual gives practical instruction by directing the student how to make his own researches, commencing with the list of special indications given by common salt, and ending with some of the most complicated of organic compounds. The instruction contained in it is thorough, correct, and comprehensible.

**REPORT ON THE TRANSPORTATION ROUTE ALONG THE WISCONSIN AND FOX RIVERS, in the State of Wisconsin.** By Gouverneur K. Warren, Major of Engineers and Brevet Major-General U. S. A. Washington, D. C.: Government Printing Office.

The examinations and surveys for the important investigation described in this report were made in 1866 and 1867, and some minor ones in 1868 and 1869. Major Warren reports adversely to the permanent improvement of the Wisconsin River by a system of canalization or rectification of its high and low water channels, and recommends a canal along its banks as the only method of remedying the difficulty.

**THE USEFUL COMPANION AND ARTIFICERS' ASSISTANT, including nearly Six Thousand Valuable Recipes, and a Great Variety of General Information and Instruction.** New York City: The Empire State Publishing Company.

A handy volume of household workshop and general information. It is well arranged, and the recipes and instructions are carried down to the latest date. The compiler has covered very extensive ground, gives his readers instruction in agriculture, telegraphy, practical mechanics, harmony and counterpoint, book-keeping, photography, billiards, cribbage, and letter-writing. The chapter on health and medical advice is very full and explicit, and the recipes are judiciously selected from a variety of authorities, native and foreign. This book contains seven hundred pages of closely arranged matter. Price only \$2. It is probably the cheapest work of the kind that has been published.

We have another trade catalogue before us, which is suggestive not so much for the manner in which it is gotten up, which is very neat and tasteful, but for the subject to which it relates. It is a series of representations of fine clocks made by Seth Thomas' Sons & Co., and it exhibits time-pieces in bronze and marble, showing a high degree of art workmanship. The home manufacture of such clocks—which hitherto we have imported mainly from France—shows how closely we are entering into competition with the countries which have hitherto held almost a monopoly of the art industries of the world.

We are not sufficiently versed in the inner working of the cork and hardware trade to understand why the advertising catalogues and pamphlets (such as firms engaged in other businesses prepare in a simple and inexpensive manner), must be issued in the most elegant style of typography, upon the finest paper and embellished lavishly with costly engravings. Such, however, appears to be the custom; and the large hardware concerns vie with each other in preparing volumes which regular publishers would regard, so far as dress goes, as *éditions de luxe*, to be sold at fancy prices by first-class retailers only. We have just received a supplement to the catalogue of the Hopkins & Dickenson Manufacturing Company, to which the above description especially applies. It is certain that books of this class cost a great deal of money, and the simple fact that the trade indulges in such very costly advertising, proves that the same must pay. So that, after all, the books are agreeable evidence of a good state of business.

#### DECISIONS OF THE COURTS.

**United States Circuit Court—District of Massachusetts.**

EDWIN L. BRADY vs. THE ATLANTIC WORKS.

[In Equity.—Before Clifford, J.—Decided September 29, 1876.]

Letters patent for a new and useful improvement in the construction of boats for dredging under water were granted to the complainant on the 17th of December, 1867, as appears by the original patent annexed to the bill of complaint. Nothing is suggested to show that the patent is not regular in form, and the complainant alleges that the respondents are making and constructing a dredge-boat of the same construction as that described in his specification, and which is an infringement of his patent, and he prays for an injunction and for an account of all such gains and profits as they, the respondents, have received by their unlawful and wrongful acts and doings.

The court gave a decree in favor of the patent, and held as follows:—

In a suit for the infringement of letters patent the burden of proof is upon the patentee to show that he is the original and first inventor, and that the defendant has infringed.

The patent, if regular in form and introduced in evidence, affords a *prima facie* presumption that the patentee is the original and first inventor of what is therein described as his invention.

In a presumption is not overcome by evidence introduced to impeach the novelty of the invention which does not clearly show that the alleged anticipating device embodied the same construction and mode of operation as that claimed.

The English rule that the patent prohibits all the subjects of the sovereign, except the patentee, from using the invention, but that it extends no farther, and is not intended to deprive the Government itself of the use of the invention, does not hold good under our laws.

These patents are monopolies granted by the sovereign, and may be granted or refused in the royal discretion.

In this country Congress has legislated, in pursuance to the power conferred by the Constitution, and have provided that persons who have made inventions such as specified in sec. 24, (act of July 8, 1870,) may obtain a patent therefor, granting to them, for the term of seventeen years, the exclusive right to make, use and vend the said invention or discovery throughout the United States.

No exception is made in favor of the Government, and it cannot, after the patent is issued, make use of the improvement any more than a private individual, without license of the inventor, or making just compensation to him.

The invention secured by letters patent is property, and as such is entitled to the same protection as any other property.

Private property cannot be taken for public use without just compensation, except in cases of extreme necessity, in time of war, or of immediate and impending public danger.

Although the infringing device was made by the respondents under a contract with the Government, they derived no power, by virtue of their contract, to take the property of private individuals without their consent, and to use and apply the same in fulfilling their contract obligations.

#### Inventions Patented in England by Americans.

From October 6 to November 15, 1876, inclusive.

**AIR BRAKE.**—C. A. Bonton (of N. Y.), London, England.  
**AIR EJECTOR.**—John Y. Smith (of Pittsburgh, Pa.), London, England.  
**ANCHOR.**—R. M. Robinson et al., Philadelphia, Pa.  
**BRECHLOADING FIRE ARM.**—W. L. Headley, Brooklyn, N. Y.  
**CATCHING FISH.**—B. F. Smith et al., Philadelphia, Pa.  
**CHANDELIER, ETC.**—J. H. Hobbs, Wheeling, W. Va.  
**CHEST PROTECTOR.**—H. Hayward, New York city, et al.  
**COAL SIEVE, ETC.**—P. Peckham, New York city.  
**CWITTING SCREWS, ETC.**—E. Schlenker (of Buffalo, N. Y.), London, England.  
**EVAPORATOR.**—H. Hughes, San Francisco, Cal.  
**EXERCISING APPARATUS, ETC.**—J. D. L. M. Loder, Orange, N. J.  
**GAS ENGINE PISTON.**—G. B. Brayton, Exeter, N. H.  
**GRAIN SEPARATOR.**—Howes & Co., Silver Creek, N. Y.  
**HARVESTER.**—C. H. McCormick, Chicago, Ill. Three patents.  
**HAT MACHINERY.**—D. Brown, Massachusetts.  
**HORSESHOE MACHINE, ETC.**—J. R. Williams, Pittsburgh, Pa.  
**INJECTOR.**—J. F. Hancock, Jamaica Plains, Mass.  
**LASTING BOOTS, ETC.**—G. W. Copeland, Malden, Mass.  
**LIGHTING CIGARS, ETC.**—H. B. Stockwell, Brooklyn, N. Y.  
**MAGIC LANTERN.**—E. Wilson, Philadelphia, Pa.  
**MAKING SCREWS.**—American Screw Company, Providence, R. I.  
**MAKING STEEL.**—J. Baur (of Brooklyn, N. Y.), London, England.  
**MARINE SIGNAL.**—E. E. Mann, Lawrence, Mass.

**PAPER FOLDER.**—W. Braidwood, Mount Vernon N. Y., et al.  
**PAVEMENT.**—W. T. Crim, Beloit, Wis.  
**POTATO DIGGER.**—L. A. Aspinwall (of Albany N. Y.), London, England.  
**PRESERVING FOOD, ETC.**—G. W. Scollay, St. Louis Mo.  
**PRINTING CHECKS.**—W. A. Simmons, Penge, England.  
**REFRIGERATOR.**—J. J. Craven, Jersey City, N. J.  
**SADIRONS, ETC.**—T. H. Ashbury, Philadelphia, Pa.  
**SCREW MACHINERY.**—S. Vanstone, Providence, R. I.  
**SHOE TAPPING.**—L. R. Blake, Boston, Mass.  
**SOLDERING CANS.**—W. H. J. Howe, North Salem, N. J.  
**STONE DRESSING.**—J. Woods, Nicholasville, Ky.  
**STOVE.**—Jewett et al., Buffalo, N. Y.  
**TURBINE FOR SMALL MACHINES.**—J. Fletcher, Philadelphia, Pa.  
**VALVE STOPPER.**—E. B. Requa et al., New York city.

#### Recent American and Foreign Patents.

##### NEW AGRICULTURAL INVENTIONS.

###### IMPROVED STEAM PLOW.

George F. Bratt, New Orleans, La.—This machine consists mainly of the following elements: 1. Circular rotary cutters (attached to a drum) which divide the sod into parallel strips or slices; 2. rotary spades or cutters, which follow immediately behind the aforesaid circular cutters, and cut or divide the strips or slices into small pieces and then turn said pieces top side down, operating in this respect like the mouldboard of a plow. They likewise cooperate with the circular cutters in propelling the machine, thus rendering unnecessary all supplementary driving mechanism which does not aid in cultivation. The invention consists, 3, in blades attached radially to a shaft, and which follow the cutters and rotate at higher speed, so as to cut, break up, and thoroughly pulverize the soil dislodged by said diggers, thereby completing the work of reducing it to the desired fineness of tilth.

##### NEW MECHANICAL AND ENGINEERING INVENTIONS.

###### IMPROVED VENTILATOR FOR CARS, ETC.

John C. Bates, Cold Spring, N. Y.—This invention relates to an improved ventilating apparatus specially designed for railway cars, but applicable to and intended for buildings also. It consists in the construction and arrangement of parts in which an inlet pipe for the air, leading from the top of the car, carries from the motion of the car a current of air down into a cylinder having a deflector and water trap to eliminate the cinders, the air passing from thence through an externally heated drum into the car. The said drum is constructed with end chambers connected by tubes and is located in a containing case into which hot air is admitted from a heater below the car, and from which it is drawn by a pipe terminating in the open air, a chamber being formed in the containing case of the ventilator which connects with a pipe leading to the top of the car, which receives the impure air from the bottom of the car and discharges the same in accordance with the law of convection.

###### IMPROVED LATTICE PIERS FOR TIMBER TRUSS BRIDGES.

Lewis Scott, Brighton, Mich.—In this invention two sets of posts are so arranged in a truss bridge that they will incline in opposite directions, and be located on opposite sides of the girts. They are all sustained upon a common base that is thus connected with a superposed beam so as to form a reinforcement brace or support to each other. This has the effect of dividing and evenly distributing the weight or strain along the whole length of the foundation or base.

###### IMPROVED SWING.

William Mogle, Anoka, Minn.—This is a swing which may be adjusted for the use of a child or a grown person, and the novelty consists of inner and outer vibrating rods, to the lower ends of which the foot board is applied by lateral pivot rods in a vertically adjustable manner, the seat being applied by arms and supporting braces to the inner vibrating rods. The weight of the person on the seat oscillates the swing in one direction, while the pressure of the feet on the foot board oscillates the swing in the opposite direction, in the customary manner, the swing working easily with little pressure on the vibrating foot board.

##### NEW MISCELLANEOUS INVENTIONS.

###### IMPROVED TOBACCO PIPE.

Martin Bourke, Mineral Ridge, Ohio.—This device is an improvement in the class of cigar pipes or pipes having the form and general appearance of a cigar, and designed for smoking fine cut tobacco. The improvement relates particularly to the provision of a detachable inner tube or cylinder for holding the tobacco, and to the form of the inner end of the mouthpiece against which the tube abuts; also to a spring attached to a detachable endpiece or plug, and whose function is to hold the tobacco tube against the mouthpiece.

###### IMPROVED FOOT WARMER FOR VEHICLES.

Henry P. Buckland, Stary Ridge, Ohio.—The object of this invention is to furnish a device for keeping the feet and lower extremities warm while riding in the winter months. It consists of a receptacle for containing hot water, having a triangular chamber for one or more lamps, extending through it, provided with doors and a smoke flue.

###### IMPROVED OIL CAN.

Leonidas R. Shell, Richmond, Va.—This invention relates to an oil can, having attached within it a force pump and measure, so constructed and arranged that the oil may be pumped from the barrel or cask, either into the can itself or into the contained measure; the latter being provided with a gauge, which, at all times, shows how much oil it contains. When it is desired to fill the can the oil may, by this arrangement, be made to pass, first into the measure, gallon by gallon; thus readily showing how much is transferred from the barrel to the can; and, when selling the oil by retail any definite quantity may be drawn, immediately from the can, by means of the contained pump, measure, and gauges.

###### IMPROVED LAUNCHING APPARATUS.

Martin Bourke, Mineral Ridge, Ohio.—This invention has for its object to enable life and other boats to be launched from the deck of a vessel, with safety and dispatch. The invention consists of ways which are pivoted to the deck in such manner that the outer end which projects beyond the side of the vessel, may be raised or lowered by suitable tackle, as required by the size of the vessel, or the height of the deck above the water. The sides of the groove in the ways are notched or provided with ratchet teeth, and with these, a pawl, attached to the keel of the boat, engages in such manner as to hold the boat stationary on the ways until ready to be launched. Said pawl is also constructed in such form as adapts it to act as a brake when the boat is descending the ways. The ways are made in sections to adapt them to be stowed in small space.

###### IMPROVED LIFE BOAT.

Martin Bourke, Mineral Ridge, Ohio.—The object of the invention is first to produce a life boat which will insure perfect protection to the passengers from the waves, which shall be of such shape that it cannot remain capsized, and also combines maximum strength, lightness, and cubical capacity. The object is, secondly, to provide a life boat with a deck or cover to perfectly protect the passengers from wind and waves, and which may be readily detached by the passengers to facilitate their escape when the boat is about to encounter reefs, rocks, or other obstacles, or is otherwise in extreme danger of destruction. The third part of the invention relates to propellers or paddles, which may be held locked in such position that they will not impede the progress of the boat when sails are being used. The invention relates, fourthly, to an improved construction of paddles and deadlights.