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Improved Horizontal Steam Engine.

The design of the horizontal steam engine, illustrated in the accompanying engraving, shows that in engineering as well as in other matters, "Westward the star of empire takes its way." For a long time the principal cities in the Atlantic States have supplied the market with the best class of engines, and still the larger proportion of engines yearly turned out, are from Eastern manufactories. The design herewith presented will show, however, that the older shops in the East are no longer free from Western competition, and that they must now expect to yield at least a portion of the field to younger, though fully as enterprising, establishments.

This engine is built from designs prepared by Mr. Isaac V. Holmes, who, for a number of years was superintendent of construction at the Novelty Iron Works, New York city.

In the planning of a steam engine, the great desideratum to be obtained is, the combination of simplicity of parts and proper distribution of material for strength, with such a correct proportion of the working mechanism as shall give the highest possible stability, durability, and economy in the use of steam. These points have been kept prominently in view in this engine.

The bedplate contains, in one casting, the shaft, pillow block, crosshead, slides, cylinder head, and stuffing boxes for piston rod and valve stems, thereby avoiding all trouble from bolts and joints failing or working loose. Its form and section are those of a girder, wherein the metal is so distributed as to give great firmness and stability.

The end of this bedplate containing the pillow block is formed with heavy flanges, extending out into a broad and strong base to rest upon the foundation; while the opposite end, forming the cylinder head and slides, is so disposed as to furnish an equally strong supporting base for the cylinder, the two being united by an elliptical arch, which resists all lateral motion caused by the angular thrust of the connecting rod.

To this head, provided with broad and heavy flanges, is bolted the cylinder and steam chest in one casting.

The chest, being placed at the side, gives ample width, to the structure, for stiffness, and also allows the cylinder posts to extend below the bottom line of the cylinder bore, to insure complete drainage through the exhaust passage.

The outer end of the cylinder is provided with a faced lug, resting upon, but not attached to, a pedestal firmly bolted to the foundation. This supports the weight of the cylinder, and, at the same time, allows perfect freedom for expansion caused by the heat of the steam; and, as the cylinder, steam chest, slide valve, and piston rod, lengthen in the same direction, the engine will have the same clearance and lead when at work as when cold.

In the manufacture of these engines they are divided into three classes; first, those with the single slide valve, cutting off by lap, at two thirds of stroke, and not adjustable, with a good reliable governor attached to steam chest; strong, plain, solid engines, adapted to saw mills and any kind of work where simplicity and durability are wanted, and where saving of fuel is not an object. The second class includes those with cut-off valves, arranged to close at any part of the stroke, and adjustable by a hand lever while the engine is in motion; the cut-off point being indexed, so that the engineer can see it, and the speed of the engine being regulated by a Judson governor. Engines of this class are suitable for driving grist mills and other machinery carrying a steady load, and only varied at stated times, when the point of cut-off can be readily adjusted to the load; and they are claimed to give, under such circumstances, a maximum result in the economical consumption of fuel, combined with a simplicity of valve gear that can be placed in the care of ordinary engineers.

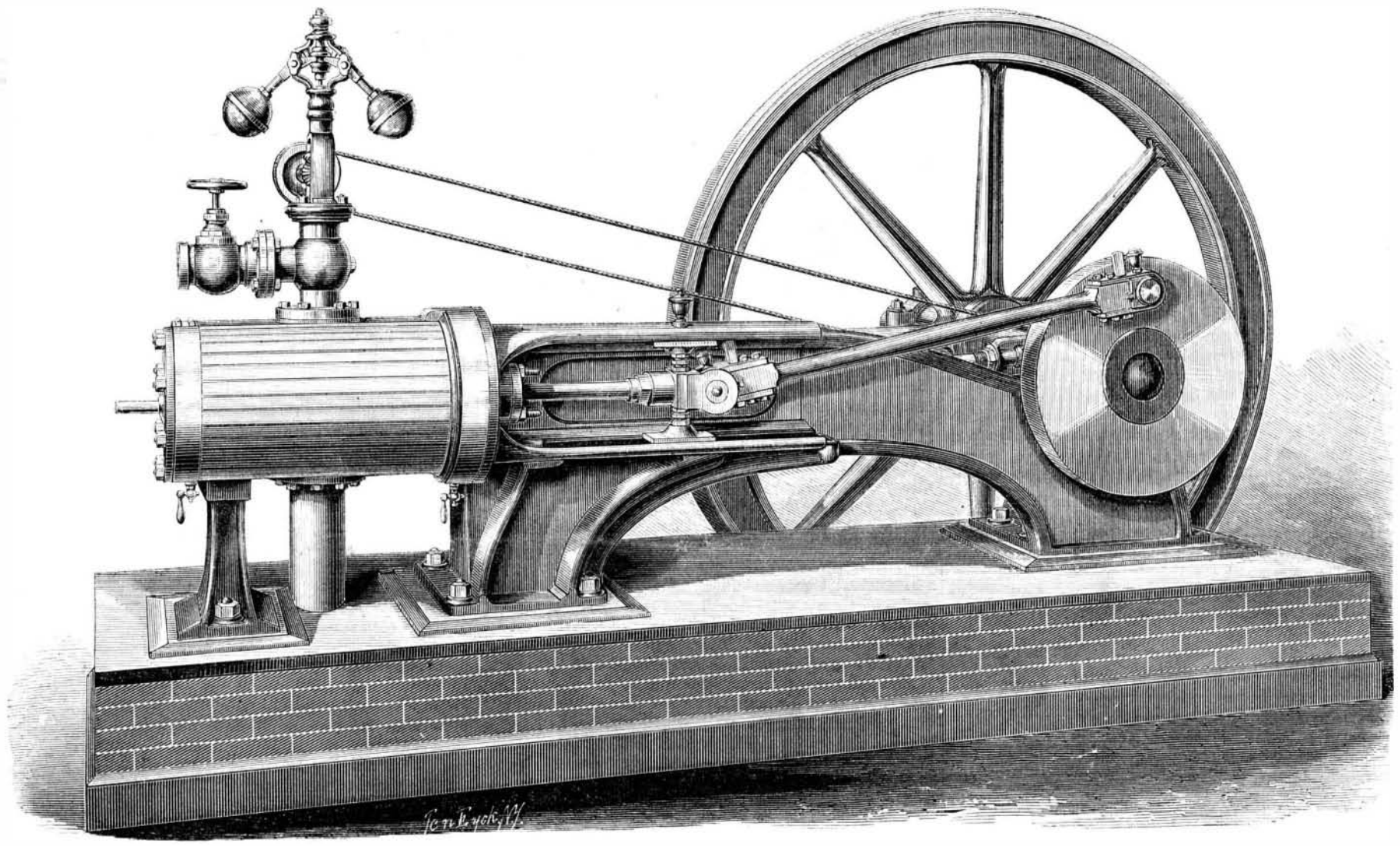
The third class comprises those with steam-jacketed cylinders, fitted with the Babcock & Wilcox patent automatic cut-off, valve gear, and governor.

These engines are especially adapted to use in mills and manufactories where the power is variable; and it is claimed that they combine, in the highest degree, strength and durability, with perfect regularity of motion, and consumption of the least amount of fuel. We are informed that engines of this class having developed a horse power with 2 $\frac{7}{10}$ pounds coal.

In the designing of these engines, the flat slide valve, embodying the most favorable possible conditions for tightness after wear consequent upon long use, has been adopted; also, all the journals and bearings are fitted with self-feeding oil-cups. The piston rods, pins, rods, and connections are of polished steel.

The manufacturers of these stationary engines have also adopted the same principles of construction in their portable engines.

Parties wishing for further information and descriptive circulars, can address the manufacturers, John Cooper & Co. Mount Vernon, Ohio.



COOPER & CO.'S STATIONARY STEAM ENGINE.

Potato Diggers.

Commissioner Capron, in his last report, says:

The number of patents granted, during the year, on potato diggers shows that the zeal of inventors with reference to these machines is unabated. It is questionable whether a really effective machine for digging potatoes has ever been brought before the public; that there have been very many which are utterly worthless, is certain. The large majority of these inventions are too cumbrous and complicated to be sufficient.

It will do well enough to multiply wheels and springs ratches and pawls, when these are to be employed in shops, and places where there will be no extraneous hinderance to the operation of the machinery; but when it comes to adorning with these appliances a potato digger which has to deal with the insidious soil, penetrating into every crack and crevice, the fewer of these devices, the better the result.

Many of the inventors of potato diggers have put their theoretical ideas into such shape that a person who wants to see the model of machine calculated to clear the vines, remove the earth, raise the potatoes, sift them clean, separate the large from the small, and deposit each sort into different baskets, can have his curiosity gratified by inspecting the cases of the United States Patent Office.

The potato diggers patented are generally a modification of a structure like the following: A rectangular frame mounted on two wheels and provided with a tongue, with a vertically adjustable scoop or shovel, affixed by suitable pendants or hangers, which has been designed to pass under the hill, carrying the earth and potatoes back to a shaker, where they are separated, the earth dropping, and the potatoes being carried to a screen, where they are more thoroughly cleaned. The shaker is often a revolving apron, but more frequently a series of bars or rods, which are occasionally jointed or hinged in such a way as to admit of a "jumping," or vibratory motion. Occasionally one or more revolving shafts is placed beneath the shaker, such shafts being provided with spurs or

teeth passing up between the rods, the more effectually to disintegrate and remove the adhering soil.

During the year, there were two inventions in this line patented, which differ radically from those patented in any previous year, and which promise great effectiveness. The first is provided with wheels, tongue, and frame as above described. To the tongue, about at the juncture with the whiffletree, there is secured a shovel plow, which is intended to remove the soil from the top of the potatoes. Just in the rear of this plow, one on each side of the line of the tongue, are placed two rollers, whose longitudinal axes are parallel with the direction of the draught, and which consequently revolve transversely to the track of the machine. These rollers are revolved by suitable gearing from the traction wheels and are provided with curved teeth, spirally arranged, which enter the soil, raising and cleaning the potatoes. The other machine has, for the digging and cleaning parts, two concave disks arranged at an angle of about 45°, which are perforated or slotted to permit the passage of the earth, the potatoes being delivered in a single line at the rear of the machine and directly in the opened ridge.

HARVESTERS.

In the department of harvesters the inventions patented are directed exclusively to the improvement of standard machines. The beginning of the year found reaping and mowing machines with numerous defects, the chief of which were faulty gathering and delivering devices. Many of the machines belonging to this class require, besides the driver, a man or boy to rake up the cut grain in suitable bundles and discharge it from the platform. Much has been done toward dispensing with the attendant, and making the machine automatic. In performing the operation of gathering, the revolving rake is generally and successfully employed. The defect in the delivery arrangement is this: the grain has been discharged directly in the rear of the machine, or upon that portion of the ground occupied by the grain just cut, so that the horses in making their next circuit tramp upon it if it be not bound and removed. To obviate this a number of patents have been granted during the past year in which are employed automatic binders, designed to secure the cut grain in sheaves, which are deposited on the ground at a point out of the way of the horses.

The tendency of improvements in harvesting machines is to make them lighter and cheaper, the latter desideratum being often obtained at a sacrifice of substantiality in the structure. It is matter of remark how much power is employed in a harvesting machine to effect a small amount of work. It is obvious that to cut a swath of grain requires no greater strength than that in a man's arm, and yet to accomplish it, two to four horses are generally employed. This point has not been overlooked, and efforts have been made to mitigate the evil.

It is esteemed a desideratum to have one machine adaptable to the cutting of both grass and grain. To accomplish this result, efforts have been directed to producing a change of motion, as to cut grass a greater rapidity of the cutting instrument is required than in cutting grain. The common method is that in which a sliding pinion or spur wheel is employed, so that by a change from a large to a small gear, or *vice versâ*, the speed of the cutter may be increased or diminished.

Of the devices used directly to cut the grain, including the endless toothed belt, the rotary saw, and the reciprocating cutter-bar, the latter retains by far the larger number of admirers. Outside of the fact that inventors would naturally endeavor to evade the patent on this device, and to procure some other instrumentality that, without infringing it, would effect the same result, efforts have been made to avoid, by some means, the noise, shaking motion, and jar caused by the rapid working of these machines, as prejudicial to the nerves of the operators as to the durability of the implements. The other devices named, the belt and the rotary saw, are not so obnoxious to the charge, but they do not meet with the favor which is lavished on the reciprocating cutter-bar. To obviate this shaking, and noise, an inventor some years ago obtained a patent for a divided cutter-bar, but arranged the dead-centers of the cranks, to which the cutters are connected, at right angles to one another, thereby just doubling the evil. It is obvious, however, that this invention may be turned to advantage by arranging the dead-centers in a line, whereby the shock of one side will be met and counteracted by that of the other, and thus produce a smoothly running and almost noiseless machine for harvesting operations.

ARTIFICIAL JEWELRY.

Condensed from the English Mechanic.

This is a very extensive and important trade. It is of remarkable interest to a superior class of English artisans just now, because the factories, which used to furnish the promenades, the shops, and the pavilions of the Palais Royal, in Paris, are idle and silent for awhile, and the manufacture is coming over to England.

Your Parisian master is a critic of precious stones; he knows how to cut them, he then knows how to mount, and, immediately afterwards, how to imitate them; he is an artist in enamel, mosaic, and gilding; he can amalgamate gold with silver, producing every kind of splendid illusion. Now amongst the objects of human desire, vanity considered, may be reckoned jewels, true or false; they are prized for particular variations of weight, light, and color. There are worshippers of the diamond, and devotees of the opal; the ruby has its adorers, and the emerald its slaves. But we cannot all afford to wear these gems of the earth, with their far-darting rays and gleams of twinkling brilliance. A philosopher's stone, of some sort, must be found, which shall convert cheap substances into glories; and to begin with—what is the false French diamond, for which so enormous a desire has for years been exhibited at Paris, which was, until lately, the very center of this sparkling commerce? It is a bit of colorless paste, super-imposed upon another, with a darting central radiance; both perfectly white, except for the prismatic aurora incessant playing through them. But you may g ind, for this most fanciful among the fancies of mankind, an oriental sapphire, a topaz, an amethyst, or a crystal; and out of the gleaming powder shall arise a beautiful imposture, which none except a professional lapidary would pronounce to be other than a diamond. But the process is exceedingly delicate, excessively difficult. The cutting is a most singular art; the tools must be selected with not less scrupulousness than are medicines for delicate children.

And as for the ordinary materials! Fancy a Parisian mechanic, engaged upon these manipulations, employed to make a false diamond out of white sand; first washed with hydrochloric acid, and then with simple water, minium, calcined soda and borax, and oxide of arsenic! Here we have a combination entirely lucid; but when the Parisian artisans came to the sapphire—the second in their estimation, of all precious stones—they have to deal with its wonderful and varying colors as of those, especially, from Pegu and Cambay, from Ceylon and Bohemia. The obstacle lies in the production of that lovely dark light, burning in, and bursting from, its heart; for which the stone is famed, in all its hues—white, (the rarest), pale blue, ruby tinted, vermilion, milk colored, violet, and green. Well, go to the Jews of Amsterdam, and they will charge you a hundred guineas for a sapphire; but buy a little strass and oxide of cobalt, and you can make one for yourself. We lay no great stress on the Parisian fabrication of chrysoberyls, chrysopals, and "floating lights," which are really not jewels in the strict sense of the term. The last, known in the slang of the French market, as aquaphonanes, are of an asparagus green, rather shell-shaped, with two refractions, and pretty enough when flashing under a galaxy of chandeliers. But the French, and, in a still greater degree, the English mechanics, have encountered a far deeper embarassment in treating the ruby—always providing that mere red glass and the other pitiful ideas of toy arcades are out of the question. Properly speaking, there is only one ruby, (known to the lapidaries as the spinel), of a tender red; the Oriental, Barbary, and Brazilian are generally sapphires, amethysts, or topazes. The color of the true stone may best be described, perhaps, as a combination, exquisitely delicate, of rose and cherry; but some are wine-tinted, or of a violet hue, or tinged with yellow. It is astonishing how far a mixture of white lead and pulverized and calcined flints will go in competition with the jewel beds of India. So with emeralds: the same paste as is used for artificial diamonds, is blended with a precipitate of oxide of copper, and the green gem sparkles brilliantly. The garnet requires paste dyed with the "purple of Cassius;" it is, however, exceedingly difficult to imitate its starlike ray. Oxide of cobalt and the Cassian purple will produce a beautiful semblance of the amethyst, though a better is obtained by a mingling of white sand, treated with hydrochloric acid, red lead, calcined potash, calcined borax, and the purple. Thousands of these mock gems are annually sold, at considerable prices; and thousands of them are worn by those who would have the world believe in heirloom jewels.

Do you admire Mademoiselle's coral necklace? It is made of resin and painter's vermilion—about as much of the latter as dazzles on her cheek. Or her pearls? False pearls were absolutely invented in the capital of France—false in so many of its fashions. Thence the art spread throughout Italy. The manufacture is exceedingly curious. As its foundation are used the scales of the blay, a small flat fish, with a green back and a white belly, the latter being of a very silvery appearance, and easily detached. The scales are scraped into bowls of water continually changing, dried in a horse-hair sieve, melted, and converted into "essence of the East," to which is added a little gelatine, and this mixture is spread, with the utmost care, over delicate globes of glass. When cool, these are pierced and filled with white wax, to give them the necessary solidity and weight. Ocassionally, real opals, powdered, are used for the more costly kinds. The Turks carry on a great traffic in "pearls of roses," colored from rose leaves crushed in a mortar. The black, red, and blue varieties are mimicked with equal ease, and there is an affectation of adding to their charm by perfuming them during the process with attar and musk. Among the ingredients also employed may be mentioned Japanese cement and rice-paste. The modern romans have a simpler method. They use little alabaster marbles, and the scales from oyster and other shells triturated in spirits of wine, coated with white wax, heated to a high degree. The trinkets imported as "Venetian Pearls" are glass, and their production presents no difficulty.

Now, as to the mounting. Infinite care is bestowed upon this by your French artificer. He has to consider how his sham settings—they must be sham since he must sell them cheap—are likely to suffer from the action of heat, of electricity in the atmosphere, of oxygen, of air and water, and of acids; and he resorts to copper, lead, platinum, iron, steel, gold, silver, and their amalgams accordingly. The history of their manipulation by his or several sets of hands, is worth noting: the softening, the purification, the moulding the washing, the hammering, the melting, the coloring or bleaching, the chiselling, and so forth, through an entire, technical dictionary. There are instruments for stamping instruments for welding, instruments for soldering. One workman chamfers; another flutes; another stands at the laminating machine; the fourth bends over the delicate enameller's knife, sharp as a diamond's edge, and nearly as hard; a fifth subjects the completed work to a microscopical examination. Not fewer than ten differently-shaped hammers are used. This industrial economy is peculiarly interesting. The diversity of aptitude, of course, encourages the division of labor, as will presently be seen more minutely.

For the moment, let us revert to the French meretricious jeweller's other arts—those of coating common with precious materials, and enamelling. Few persons have any idea of the extent to which these tricks in manufacture are carried. The ingenious and cheap French enamel, white or colored, made up into rings, collarets, and bracelets, brings a great profit to the workmen, and is really attractive. But it requires time and study to obtain a mastery over this art. There is the fixing of the translucent glass upon the metallic surface, the painting of the vitreous plane, the choice of tints, the subtle application of heat, the consideration of chemical action exercised by one oxide upon another, and the due admixture of materials. Then, the engraving of enamels is a task requiring all possible exactness and tenderness of touch. We hardly reckon among these gaieties—so to call them—of picturesque industry, mock mosaics, damascening, or gilding, although the last is a very important affair in the light of France, which pretends to be the great gilder of the world—gilding even its young men, as Juvenal dares to assert the Romans gilded their goddesses—of flesh and blood. The Parisians style this "gold" coloring—and their methods are extremely various—the oil, the hot, the cold, the bronze, the copper, the steel, and the ether; but the magic of silvering is scarcely less intricate, especially when the surfacing is to be totally false, or what is termed "argenterie des charlatans." As for coating copper with gold, which is quite different from gilding, this belongs altogether to a higher artisanship, applicable also to lead, and even to iron. Next in order are the much esteemed steel trinkets manufactured by the French. The invention is of old date, and the finish and polish of the fancies produced for the Palais Royal by the artificers of the riotous Faubourg St. Antoine have never been excelled, even by the ambitious mechanics of Austria, who are Dutch in their perseverance, and Italian in their taste. But, after all, these artists aim mostly at the imitation of jewels or gold.

Shall we reveal another of their secrets after the manner of a cookery book? Take a little powdered sulphur, sprinkle it with boiling water, mix well; boil the concoction, strain through fine muslin; put the liquid into a vessel containing the substance with which you desire to play the Rosicrucian trick, resort to another boiling, and your Cornish tin is—*presto!*—Babylonian gold! A dash of spring aloe juice, of salt-peter or sulphate of zinc improves the imposture. How far this deceptive art has been carried may be judged from its catalogue of styles: The Lamb, the Arch, the Turkish, the Myrtle branch, the Maltese Cross, the Dead, the Star, the Lance-iron, the Violin, the Hatchet, the Rose, and the Turtle. Into a similar category come agraffes, opera glasses, decorative shoe buckles, ornamental buttons, fancy watch keys, cream spoons, writing pencils, punch ladles, jewel caskets, scissors, pipes, egg cups, and tobacco boxes—all imitations, my friends, all gew-gaw, and yet not a little pretty.

But in no branch is this fraud—for it is a fraud when the prices charged are those due for genuine materials—pushed farther than in that of honorary decorations, without one of which no Frenchman appears able to live. There is the Order of St. Ampoule, or the oil which was brought from heaven by a dove. It is a bit of gilt copper with an attachment of black ribbon. The Palais Royal charges you fifty shillings for it. So with the order of the Weasel, of the Star, of St. Louis, of Mount Carmel, and St. Lazare, of the Dog and Cock of St. Michael and the Holy Spirit, and even of the Legion of Honor. They were all prostituted to the purposes of a jeweller's profit. Nor is it generally known what a manufacture of foreign decorations was, until lately, carried on at Paris. The English Order of the Garter itself has been forged in the French capital, and worn at continental courts. That of the Golden Fleece, the pride of Imperial Austria, has been successfully imitated, though its collar is at once exceedingly rich and of exceedingly delicate workmanship. We have seen Napoleon's Iron Crown—not to be compared with the old and proud *signum* of Lombardy—so perfectly counterfeited as to escape detection more easily than a mock Waterloo bullet. The Danish Government is so jealous of anybody assuming the blue ribbon of the Danish Elephant, that it ordains a perpetual exclusion from court of all individuals buying these spurious sparkles.

Now, not to prolong a series of examples already sufficient, we may again remark that a number of workmen in Paris have, for many years, been dependent upon this industry, and thrived by it. It is not by any means a degrading business. The deception is, in fact, no deception. It is avowed in the market-place; the objects are sold as shams; no one of common sense or knowledge could take them to be anything else; but they bring, or have usually brought, to the artisans of Paris, an enormous annual income.

IN our issue of February 18th, we published a short paragraph, stating that no successful advertising agency had been established south of Baltimore. We are in receipt of a letter from Walker, Evans & Cogswell, of Charleston, S. C., who inform us that they have conducted such an agency for many years, with entire success.

SILK CULTURE.—ERRATA.—In the article on "Silk Culture, published in our issue of March 18th, in column 2, paragraph 7, lines 2 and 4, for "*month*" read "*moult.*" In column 3, line 9, read "*hatching out*" for "*hatching only.*" In line 47, same column, for "*less importance*" read "*no less importance.*"