

great an authority, was the most powerful we must ever expect to possess, and defines with wonderful distinctness particles which the latter cannot render visible at all. It magnifies three thousand diameters with the low eye-piece, or, with a Number Five eye-piece, fifteen thousand diameters—that is to say, in popular parlance, one thousand five hundred and seventy-five millions of times! It must immensely increase our knowledge of the lower organisms, and may even aid our researches into the ultimate constitution of matter. And who shall say that even its powers may not be exceeded in time?

#### MISCELLANEOUS SUMMARY.

**SPECTACLES FOR HORSES.**—The United States *Gazette* relates the following incident: A gentleman had an old and valued horse whose sight was defective. For some time past the quadruped evinced a tendency to stumble, and to strain his sight at objects close to him, in a manner that set the kind-hearted owner to devising a remedy. The gentleman judged that, with a pair of spectacles, the horse would do as well as when in his prime. An optician ground to order a pair of pebble glasses, about the size of the object glasses of a large sized lorgnette. They were fixed in a frame over the horse's eyes. That animal is now a horse in spectacles, and not an elderly gentleman ever yet showed greater appreciation of the convenience. When in the stable the spectacles are removed.

**TO KEEP EGGS.**—M. Burnouf recommends, in *Le Belier*, a French journal of agriculture, the following method of preserving eggs:—Dissolve in two-thirds of warm olive oil one-third of bee's-wax, and cover each egg completely with a thin layer of this pomade with the end of the finger. The egg-shell by degrees absorbs the oil, and each of its pores becomes filled with the wax, which hermetically seals them. M. Burnouf affirms that he has eaten eggs kept two years in this manner, in a place not exposed to too great extremes of temperature. He thinks also that the germ may in this manner be preserved for a considerable time.

**A NOVEL MODE OF COAL-SELLING.**—An exchange says: In London and Liverpool coal is delivered in bags, and some of the Philadelphia dealers, acting upon this hint, have established a new mode of delivering anthracite. The coal, carefully screened, is placed in square iron boxes, each holding about seventy-five pounds. These, to the required number, are placed in appropriately constructed wagons, and the boxes being delivered over the open sides of the vehicle are conveyed directly to the bin without dust or dirt either in the street or within doors. The new plan seems to us to possess many advantages over the old system.

**ALUMINUM ethide and methide** were recently described by Dr. Oelling, at the Royal Institution, as colorless liquids. The ethide boils at  $149^{\circ}$ , and does not freeze at  $-18^{\circ}$ . The methide boils at  $130^{\circ}$ , and solidifies at a little above  $0^{\circ}$  into a beautiful crystalline mass. Both liquids take fire on exposure to air, and explode violently by contact with water. They are produced from mercuric ethide and methide respectively, by heating these compounds for some hours in a water-bath, with excess of aluminum clippings.

The Paris correspondent of the *Chemical News* refers to the following scientific curiosity. If a crystal of sulphate of copper or sulphate of iron be put into a very dilute solution of silicate of potash, a sort of mineral vegetation grows up of the same color as the sulphate. In fact, a miniature forest may be obtained at the bottom of a jar, and by placing the crystal on the top of a layer of well-washed sand colored with a little bichromate of potash; the appearance is given of an artificial soil greatly resembling a natural gravelly deposit.

**CAR BRAKES.**—Mr. A. I. Ambler, of Detroit, who has secured several patents through the Scientific American Patent Agency is about to apply his improvements in car brakes to the Michigan Central R. R. Mr. Ambler has made this subject a protracted study, and we wish him much success in his efforts to introduce his improvements, which we hope soon to illustrate in our columns.

**LONG JOURNEY FOR A LETTER.**—Recently a number of the old-fashioned, worn-out mail pouches, from some of the western post-offices, was received at the Washington post-office. In one of them a letter was found postmarked "Vandalia, Ill., March 2d, 1836." It contained information in regard to a lawsuit before "a justis," upon which an appeal had been taken, requiring "twenty days' notice," and came to light twenty-nine years and twenty-three days after it was mailed, having been carried about all that time for ten cents.

**BLAKELY GUNS MADE IN MASSACHUSETTS.**—The Putnam Machine Company have completed at their manufactory in Fitchburg a couple of 11-inch cannon, of the Blakely pattern, which weigh upwards of 43,000 pounds apiece. The breech is clad with a thick steel jacket, and this jacket is encircled with steel rings, making a thickness of about 12 inches of solid steel around the castings. They are for the defence of Boston harbor and cost about \$25,000 each.

**VALUE OF RHUBARB FOR DOMESTIC WINE-MAKING.**—The cultivation of the rhubarb wine plant is attracting some attention at Fentonville, Mich. Last year two gentlemen procured 1,000 plants and set them out upon half an acre of ground 3x4 feet apart, and from the shoots they manufactured 440 gallons of wine, worth in this and Eastern markets \$3 per gallon. It is called American sherry, and is said to possess valuable medicinal qualities, besides being a fine rich-flavored beverage.

**ARRIVAL OF CHOICE SEEDS.**—The Commissioner of Agriculture has just received another lot of choice seeds, such as he has uniformly received and distributed. Among them are fine specimens of barley, oats, buckwheat, Alsike clover, varieties of bush beans or runners, pearl or round Turkey peas, Brussels sprouts, early short-horn carrots, turnip-rooted celery, large white kohlrabi, and varieties of white and red cabbage.

**GOVERNMENT EMPLOYMENT OF WOMEN.**—There are about 700 female clerks employed in the Treasury Department, and selected from almost all the States in the Union. Many of them have been rich but are now poor. Their chief business is in cutting and counting new legal tender and national bank notes, and in counting and destroying old ones. Their pay is \$720 per annum each, for about six hours close work per diem.

**AN EGG CARRIER WANTED.**—Eggs are usually packed for market in oats, that grain having been found the best for the purpose. They are apt to get musty, however, and the eggs do not always arrive in good order, by any means. The oats also take up a good deal of room that might be economized, besides being very dear at the present time. Here is an opportunity for the ingenious. Time and money would be saved by a suitable egg carrier, both for market and family use.

**REBEL PATENT OFFICE.**—In our last number we alluded to the operations of the rebel Patent Office for the year 1864. Judging from the events of the past few days we presume that the business at that office has come to a stand still. Commissioner Rhodes, we presume, has gone off with his master Jeff to parts unknown.

**RELATIVE DENSITY OF POPULATION.**—Ireland still supports 184 souls to every square mile, France only 178; Spain supports only 80 souls to the square mile, Austria only 148, Prussia only 172, Bavaria only 161, Sweden and Norway only 19, European Russia 32. Only Italy, England, Holland, and Belgium are more thickly populated than Ireland.

It is announced that an inventor residing in Pittsburgh, has challenged Sir William Armstrong to a trial in November next; each piece to be fired two hundred consecutive times.

Having a poor opinion generally of Sir William's gun we do not think our countryman would gain much renown by achieving a victory.

#### High Winds in England.

They have some high winds in England, as may be seen by the following lines cut from the *London Engineer*:—"It may be interesting, in connection with the north-eastern district, to note the fact that a railway train was stopped near Jarrow, last week, by the force of a furious north-west wind."

#### New Application of Spectrum Analysis.

The *Chemist and Druggist* says: There seems to be no end to the applications of spectrum analysis. With the wedge of glass, chemists, astronomers, and physiologists are opening Nature's safes, and disclosing things of inestimable value. Now, a new metal is brought to light; now, the constitution of the sun's burning atmosphere is revealed; and now a problem respecting the nature of the celestial nebulae is solved.

In a paper, recently brought before the Royal Society by Dr. Henry Bence Jones, the latest application of spectrum analysis is described. It occurred to the author that it might be possible to trace the passage of substances from the blood into the textures of the body by the aid of the spectroscope, and, with the assistance of Dr. Dupre, he has obtained some very remarkable results.

The metal lithium, which can be readily detected, when in extremely minute quantities, by the spectroscope, was selected as the substance to be traced, and guinea-pigs were generally used for the experiments. Usually, no lithium could be found in any part of their bodies; but when half a grain of chloride of lithium had been given to a guinea-pig for three successive days, the metal was detected in every tissue of the body. Even in the non-vascular textures, as the cartilages, the cornea, the crystalline, lithium was found.

Two animals of the same size and age were taken; one was given three grains of chloride of lithium, and was killed eight hours afterwards; the other, which had no lithium given to it, was also killed. A piece of the lens, 1-20th of a pin's head in size, taken from the former, showed the lithium spectrum distinctly, proving that the metal had penetrated to the very centre of the lens. When the whole lens of the other animal was burnt at once, no trace of lithium could be detected.

A patient, who was suffering from diseased heart, took fifteen grains of citrate of lithia thirty-six hours before her death, and the same quantity six hours before death. The crystalline lens, the blood and the cartilage of one joint were examined for lithium: in the cartilage it appeared very distinctly; in the blood exceedingly faintly; and when the outer lens was taken, the faintest possible indications of lithium were obtained.

Another patient took ten grains of carbonate of lithia five hours and a half before death: the lens showed very faint traces of lithium when half the substance was taken for one examination; the cartilage, however, showed lithium very distinctly.

The importance of these results cannot be questioned. Our most valuable medicines, like the salts of lithium, belong to Graham's class of crystalloids, or diffusible substances; and their rapid action upon the system can now be partially understood. We trust that Dr. Bence Jones will continue his investigations, for the results already arrived at lead us to believe that spectrum analysis may do much for Therapeutics.

#### The National Debt.

The official statement of the public debt on the 31st of March shows that the amount outstanding bearing interest in coin is \$1,100,361,241, the interest being \$64,016,631. The amount bearing interest in lawful money is \$751,055,128, the interest being \$38,819,899. Debt on which interest has ceased, \$349,420. Debt bearing no interest, \$515,189,287. Total amount outstanding, \$2,366,954,077. Total interest in lawful money and gold, \$102,836,531.

The following is the amount of legal tender notes in circulation:—

One and two years five per cent notes.....	\$69,522,350
United States notes, old issue .....	492,104
United States notes, new issue .....	432,668,465
Compound interest notes (act of March 3, 1863) .....	15,000,000
Compound interest notes (act of June 30, 1864) .....	141,477,650
Total.....	\$659,160,569

The amount of fractional currency is \$24,254,094. Unpaid requisitions, \$114,256,549. Amount in the Treasury, \$56,481,925.

**PRECISION.**—Precision is a good trait of character. A writer in a late number of an agricultural contemporary says that 24 days, 12 hours, 43 minutes, and about 62 seconds is the turkey's natural time to sit.

**Warp Beam Elevator and Transporter.**

The value of this machine can readily be seen by the practical manufacturer. In the dressing department, heretofore, the necessary qualification in the helper has been strength instead of intelligence, and at times the overseer has been seriously troubled to obtain men who were strong enough to handle the beams, particularly on heavy work; very few men could be found who would not break down under this severe, constant labor. With this machine this difficulty is entirely obviated, while the labor of at least one man is dispensed with. Any person of ordinary intelligence can operate it. Being mounted on casters it can easily be moved in any direction and

works are very creditable to Capt. Hall's engineering skill.

**SAUNDERS'S IMPROVED BOBBIN.**

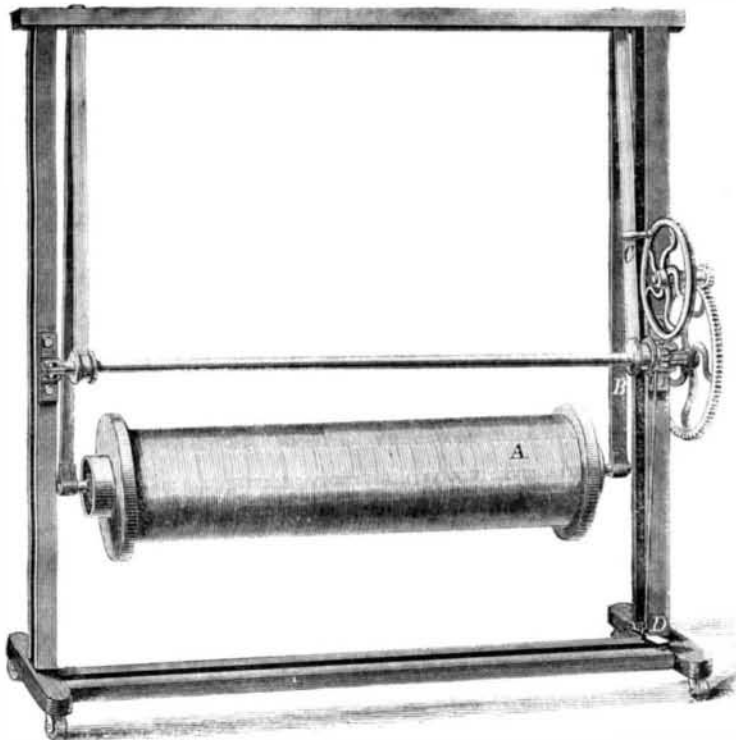
The object of this improvement is to avoid the waste which usually results from the manner of attaching the yarn to the ordinary bobbin during the process of doffing, or applying it to the spinning frame. With the ordinary bobbin the yarn is wound a few times around the barrel until there is sufficient friction to hold it securely when the full one is broken off, invariably leaving the end of the yarn flying; this flying end will get crossed and entangled in the first

This hitching groove can readily be made in any ordinary warp or filling bobbin; in fact, the inventor prefers to apply his groove to them, as the wood is harder and smoother after they have been used. Patented August 25, 1863. For further information address B. Saunders, Nashua, N. H.

**SAUNDERS'S FRICTION WEIGHT FOR BEAMS.**

This invention has been made with the view to obtain a friction on the beam that will give a uniform tension on the yarn, and thereby prevent breakages in the loom. To obtain this the inventor uses a weight, A, which rests upon the yarn on the section beam, near its head; this weight is held by an arm, B, to which it is attached in such a manner that it

Fig. 1

**SAUNDERS'S WARP BEAM ELEVATOR AND TRANSPORTER.**

quickly adjusted, relatively, to the warper, dresser or drawing-in frame, for the purpose of receiving or depositing the beam. The warper, dresser or drawing-in hands can easily change their own beams, without loss of time in waiting; oftentimes this will prove a great convenience aside from the absolute saving of time.

The operation is simple; the journals of the beam are inserted in the loops of the straps, and the power is applied to the handle on the balance-wheel; a ratchet gear on the main shaft, with a pawl attached to the frame prevents the beam from running down while being raised; this pawl is connected by a wire to a treadle, D, by means of which, the pawl can be held out of gear, while the beam is being lowered into its required position. This machine is in successful use in some of the best mills in the country. It was patented on the 16th of August, 1864. For further information address the manufacturer, A. H. Saunders, Nashua, N. H.

**CAMP NELSON WATER WORKS.**

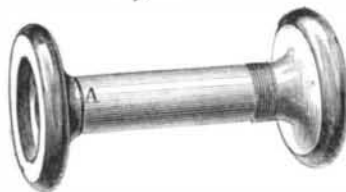
A correspondent sends us a description of the water works constructed for the supply of Camp Nelson, Ky., under the direction of Capt. T. E. Hall, formerly of General Burnside's staff. The only thing that we discover in it worthy of note is the height to which the water is forced at a single lift, this being 478 feet, measured vertically. As the water in the river rises and falls at its various stages 60 feet, the engine was placed on trestle work 75 feet above the river at its lowest stage. A simple lift and plunge pump is employed, with a pump rod of 3-inch iron 75 feet in length. The pipe through which the water is forced up into the reservoir is of cast iron 8 inches in diameter, and 60,000 gallons are raised every twenty-four hours, supplying a camp of 10,000 men and 12,000 animals. The water is distributed throughout the camp of 4,000 acres in service pipes, and the whole cost of the work was \$35,000. The

layer of yarn, and in unwinding, on the spooler or warper, or in the shuttle, the yarn will break, leaving more or less on the bobbin, constituting waste, which, at the present or even at the old prices of cotton, forms no inconsiderable item in the cost of manufacturing; very much of this waste is not apparent as yarn-waste, as the short pieces are unwound and thrown upon the floor, and appear in the waste account as sweepings.

Fig. 1

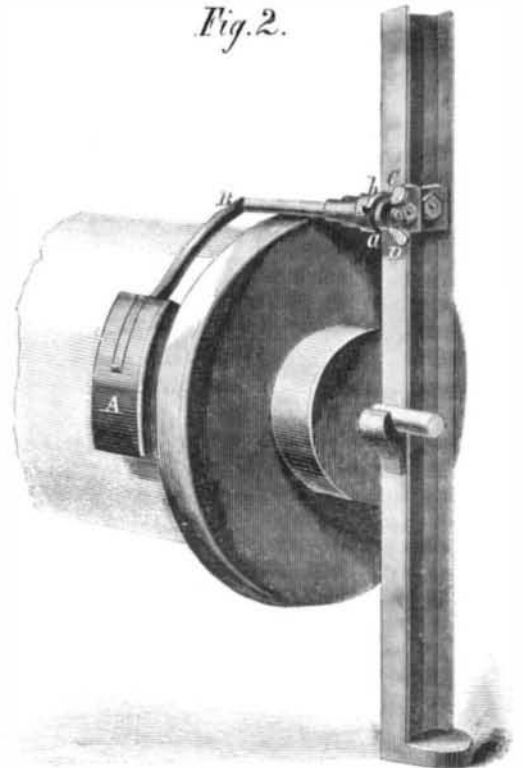


Fig. 2



This improved bobbin has an angular or V-shaped groove, A, cut into and extending entirely around, the barrel, at the foot of the taper of the head; the doffer has only to wind the yarn once, or at most twice, around the barrel of the bobbin, in this groove (the taper of the head serves as a guide to the yarn, without any particular care on the part of the doffer), break off the full bobbin close up to the groove, a habit easily and naturally acquired, and the end of the yarn is secure; the drag of the bobbin only serves to hold it more securely. The inventor guarantees that not a particle of waste will be made by leaving yarn upon this bobbin; it takes less time to doff; every end is securely fastened by the first attempt, so that the frame starts up at once, without any subsequent stopping to secure the loose and flying ends.

Fig. 2.



will conform to the surface of the yarn; this arm passes through a stand, C, which is bolted to the dresser frame, fitting so that it will readily turn in the bearing; on the end of this arm a thread is cut to fit a thumb-screw, D; this latter has a groove, a, turned in its circumference, in which a pawl, b, is fitted to retain it in its position; this pawl is attached at its other end, to the stand, and so that it can be raised up and out of the grooved nut, to allow the arm to slip through when the beam is to be changed. It will readily be seen that when the beam is full, the weight will be at nearly a right angle with the stand, giving a friction equal to its full weight, but as the yarn is unwound, and the beam grows smaller, the weight conforming to the surface will drop and be supported by the arm in the stand more and more, in exact proportion to the decrease of the diameter, and of course the friction will decrease in the same proportion. Ordinarily, with good warping, this friction will be sufficient, but if the number of the yarn is not uniformly the same, and care is not taken to weight the beam properly on the warper, it will become necessary to have more friction than the weight affords; this can be obtained by turning the wing-nut, which will bring the side of the weight to bear against the inside of the beam head, and the friction can be increased as much as may be required. The bearing surfaces of the weight are covered with leather, to avoid injury to the yarn and beam head. Actual use, says the inventor, has proved that this friction weight will save more than one half of the usual number of breakages in weaving. All things being equal, the inventor guarantees fifty per cent less breakages of the yarn in the loom with this weight on the dresser than with any other now in common use. It was patented Nov. 15, 1864. For further information address B. Saunders, Nashua, N. H.

THE breech-loading rifle Commission at the Springfield armory are very busy completing their work, and will, no doubt, strongly urge the adoption of the breech-loading rifle.