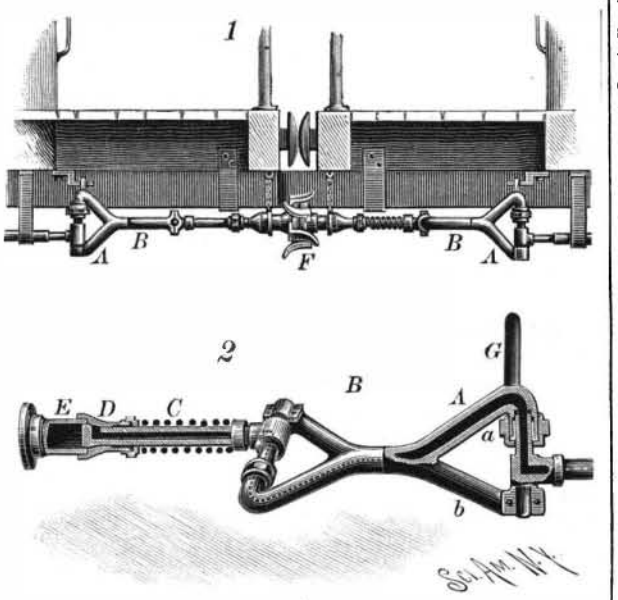
### AN IMPROVED STEAM COUPLING FOR CARS.

A coupling for automatically establishing or breaking tubular connection between the cars, or engine and cars, of a train, for conveying steam, air, or water, etc., for warming, ventilating, or analogous purposes, is illustrated herewith, and has been patented by Mr. James I. Collins, of No. 53 Willow Street, Amsterdam, N. Y. Two Y-shaped conductors, A, B, are employed, one member of which, *a*, is tubular, the other, *b*, being made solid to serve as a bearing for connections. The tubular member is carried inward to align with the outer end of the solid member, and is received in one end of an L, held to turn freely in a packing gland, making a hinged steam tight connection. The shanks of the Y conductors are connected by a nipple in such manner that one will occupy a horizontal and the other a vertical position under the car platform, as shown in Fig. 1, both sections being made alike. Into the outer end of the L is screwed a tubular rod, C, surrounded by a spiral spring, the unattached end of the rod being closed, but having a conical enlargement, with a side aperture, and being received and packed to slide in a sleeve, D, to act as a valve. A section of tubing, E, is screwed into this sleeve, having on its outer end a disk with small central aperture, there being on the outer face of the disk a rubber or other flexible packing ring, to make a close joint when brought in close contact with the similar disk of another coupling. The periphery of this disk is furnished with projecting tooth-shaped guides, F, so that when the disks of opposing couplings are brought together, they will be automatically guided to their proper relative position to insure firm contact. The coupling is supported at its outer end by a chain attached to the sill of the car, its inner end being sustained by a staple, G, from a bracket beneath the car. When the disks of these couplings, fitted on opposing cars, are brought in contact, they




COLLINS' STEAM COUPLING FOR RAILROAD CARS.

are each forced backward, causing the sleeve to slide back upon the rod, C, whereby communication will be opened for the passage of steam, hot air, etc., from one car to another, the uncoupling and separating of the cars causing the automatic closing of such communication, as the spiral spring then forces the valve sleeve and disk outward.

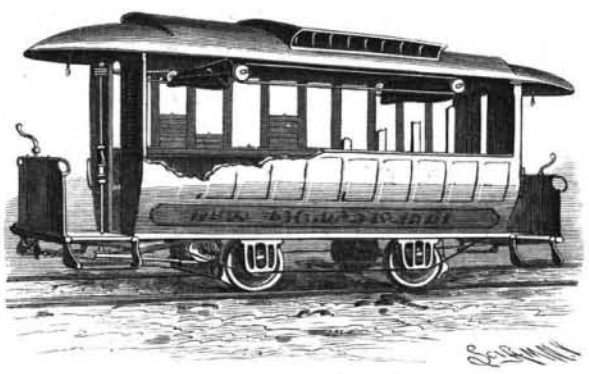
### AN IMPROVED COPY HOLDER.

A device which can be readily attached to and detached from either the upper or lower type case, to hold copy in position to be easily read by the compositor in setting up type, is illustrated herewith, and has been patented by Mr. Hugo F. Maas, of Egg Harbor City, N. J. It has a double U-shaped clamp, of wire or sheet metal, with a medial spring plate so dividing the clamp that it may be attached either to the partitions between boxes or to the outer thick frame of the case. A bent arm projects upwardly in double curved form from the clamp, such arm having a flat socket at its upper end to receive tightly a flat tongue, fixed to the lower edge of a copy-supporting rack, made with a lower back plate and skeleton frame, across the upper part of which extends a longitudinal wire. The ends of the back plate have lugs in which is journaled a longitudinal rubber-covered roller, so close to the back plate that copy passed under it may be moved up or down by turning the roller, which has on one end a milled disk for such purpose.

MAAS' COPY HOLDER FOR COMPOSITORS.

### AN IMPROVED FAN FOR CARS.

A fan attachment for cars or other vehicles, adapted to be operated by the movement of the car, and



LE BEAU'S FAN FOR CARS.

capable of being readily made inoperative at will, is illustrated herewith, and has been patented by Mr. J. M. Victor Le Beau, of 51 North Peters Street, New Orleans, La. On one of the wheel axles is a pulley, which, by a belt, drives a pulley on a vertical shaft having suitable bearings on one end of the car, adapted to be clutched with and unclutched from another shaft in line therewith and extending to the top of the car. Upon the upper end of the latter shaft is a pulley, a belt from which operates a horizontal shaft mounted transversely in the upper part of the car, carrying a fan. One or more similar fan shafts with fans may also be operated by belts or cords from the first fan shaft. The preferred connecting means between the ends of the vertical shafts communicating power from the car axle is by having their adjacent ends squared, and sliding thereon a square apertured sleeve. This sleeve has an eye at its upper end adapted to engage a spring hook on the upper shaft, to hold the sleeve away from engagement with the squared portion of the lower shaft, when the fans will not be operated, but on releasing the hook the sleeve will slide down far enough to embrace the end portion of the other shaft, when the fans will be set in motion.

### Unlooked-for Results.

How slight a circumstance may determine a man's destiny! It was Darwin's voyage in the ship Beagle that, without doubt, laid the foundations of his marvelous success as a naturalist, and ultimately gave to the world "The Origin of Species." Had he not had the wonderful opportunities, suggests the *Western Druggist*, which this trip around the world afforded him for the observation and study of natural phenomena, he would probably have been known to the world only as a somewhat heterodox clergyman of the Church of England, who had little love of theology but a kind and generous heart and a passion for the study of beetles and plants. His father's opposition at first led him to decline the proposed voyage, and when afterward he was led to reconsider the matter and make a visit to Capt. Fitz-Roy, the commander of the Beagle, that disciple of Lavater came very near rejecting him, as was afterward confessed, on account of the shape of his nose! The commander had grave doubts whether any one with a nose like Darwin's could possess sufficient energy for such a voyage.

According to Sir John Lubbock, the great physiologist and physicist Helmholtz dates his start in science to an attack of typhoid fever. This illness led him to the acquisition of a microscope, which he was enabled to purchase, owing to his having spent the autumn vacation of 1841 in the hospital, prostrated with typhoid fever; being a pupil, he was nursed without expense, and on his recovery he found himself in possession of the savings of his slender resources.

### New British Cruisers.

The British government have now in course of construction five fast cruisers. These vessels are to be of a new type, their leading feature being a combination of high speed, quick-firing guns, protective deck, and moderately heavy armor. Three of the vessels of this new class are being built in royal dockyards at Chatham and Portsmouth, and two of them are being built by the Fairfield Shipbuilding Company, Glasgow. The first of the fleet to be launched was the Magicienne, which left the ways at Fairfield on the 12th of May. The vessels are of a displacement of 3,000 tons, and their engines are of 9,000 horse power. The speed expected to be obtained is 20 knots. The engines are being made by Messrs. Hawthorne, Leslie & Co., Newcastle-on-Tyne.

The hull is 265 feet long, 42 feet broad, and the moulded depth is 23 feet. It is divided into seventy-five watertight compartments, the engine and boiler space consisting of four of these. The steel protective deck is 1 inch thick in the center and is 2 inches thick in the angles. There are two complete decks running fore and aft. The vital parts are all below the water line. The stem consists of a casting of phosphor bronze, the stern post being made of the same material. The armament will consist of nine 6 pounder Hotchkiss guns, a number of Nordenfelt guns, and six 6 inch 5 ton Armstrong guns. The engines will consist of a pair of horizontal surface-condensing engines, the dimensions of the cylinders being respectively 34½ inches, 51 inches, and 76½ inches diameter; stroke, 36 inches. There are four double-ended cylindrical boilers to work at a pressure of 155 pounds, with a grate surface of 456 square feet. There are twenty-four corrugated furnaces.

### AN IMPLEMENT FOR TRANSPLANTING PLANTS.

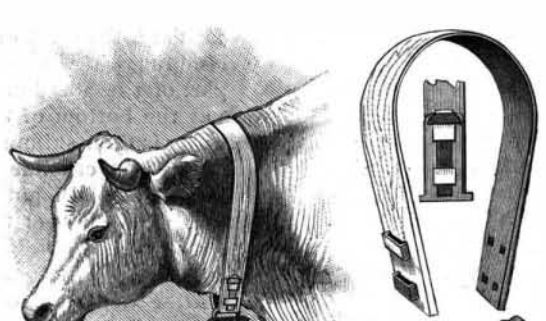
A simple and easily manipulated implement, by the use of which plants may be removed from the ground without disturbing their roots, and by which also holes may be made for the reception of plants, is illustrated herewith, and has been patented by Mr. Thomas R. Coon, of Hood River, Oregon. It is made with an annular band form of earth-cutting blade, combined with the jaws of a tongs. The tongs are so arranged that their handles when closed will close the inner jaws, to which the ends of the band-shaped blade, of spring steel, are attached, the bottom of the blade being beveled or sharpened, and its upper edge embracing a smaller circle than its lower edge, making the central opening slightly cone-shaped, as it is enlarged or contracted when the jaws are opened or closed. The manner of using such an implement in different kinds of soils will vary somewhat, according

COON'S TRANSPLANTING IMPLEMENT.

to the facility with which more or less soil may be removed with the roots of the plant.

### AN IMPROVED BELL COLLAR FOR CATTLE.

A simple and efficient bell collar for carrying cattle bells, which may be worn by the animal with more comfort than the leather straps ordinarily used, is illustrated herewith, and has been patented by Messrs. John R. and Elijah R. Hill, of New Albany, Miss. The yoke is made of bent wood, having projecting staples near its extremities, and to its lower end is fitted a metal plate clasp having rectangular perforations for receiving the staples, the ends of the arms of the clasp being bent outward to form fasteners for a T-shaped leather tongue, which is slipped to place within the staples underneath the curved extremities of the arms of the clasp. The bottom part of the clasp, between its arms, has a leather covering for receiving the wear of the staple of the bell.



HILLS' BELL COLLAR FOR CATTLE.

### Work and Wages in Holland.

A royal commission, composed of seven members, one of whom was a working carpenter, was appointed in Holland about two years ago to inquire into the condition of the working classes in that country. The commission sat for about eighteen months, and their preliminary report has recently been published. The report states that in Amsterdam the bakers work from fourteen to sixteen hours a day, in some cases for twenty-six hours at a stretch, this excessive labor being due to the competition of the large bread factories which have recently been opened, and in which the labor is from twelve to fourteen hours.

There are 5,000 working tailors, nearly all of whom work in their own homes, only one merchant tailor having shops in which the sewing machines are driven by steam, and give employment to 200 women and girls. Foreign competition is very great in the tailoring trade, and the Dutch tailors have to work very hard during the season, which lasts only three months. The workmen employed in diamond cutting—of whom there are 5,000, nearly all Jews—at Amsterdam are the best paid, as they earn from $16 to $18 and $20 a week, working twelve hours at a stretch. In the factories for making bread, vinegar, sugar, etc., in the breweries, sugar refineries, and steam mills, work is carried on both by day and night, there being, of course, two sets of workmen, though when a man belonging to one set is ill or absent, his place is taken by a man of the other set, who is thus obliged to work for 24 hours at a stretch. The royal commission, while admitting the difficulty of obtaining accurate information in all cases, states that, as a rule, adults work from thirteen to fourteen hours a day, and that out of 11,156 workmen in the province of Lemburg, which is taken as a typical case, 7,011 were men, 240 married women, 733 unmarried women, 365 girls between sixteen and eighteen, 614 girls between twelve and sixteen, and 2,193 boys under eighteen, 39 per cent of the total number being minors. A law passed in 1874 prohibits the employment of children under twelve, but the commission reports that it is not very strictly enforced, and, moreover, that children are made to work almost as long as adults. Nor does public instruction appear, despite the law passed in 1874, to have made much progress, for in Amsterdam alone 4,606 children did not attend any school at the beginning of last year, while the mean average of persons unable to read or write in Holland is 10 per cent, as against about 2 per cent in Germany. The commission states that the rates of wages may be taken at 4c. an hour for men, 3c. for women, and 2c. for children in the linen trade; while bakers earn 4c., paper makers 5c., sugar refiners 6c., painters and compositors 7c., for certain painters 12c., and engravers 16c. per hour. For ordinary workmen 6c. an hour may be taken as a *maximum*, which is 56c. a day, or $2.50 a week, supposing the man to work ten full hours. There are a good many mutual relief societies in Holland, especially in the factories, and the employers themselves subscribe in several cases. A Dutchman working twelve hours a day produces much less and is not nearly so well paid as an Englishman working fewer hours. The commission concluded its report by recommending the government: 1, to provide for the inspection of factories; 2, to execute more strictly the law relating to infant labor; 3, to prohibit women and children working by night or on Sunday; 4, to make periods of rest for both of them compulsory; 5, to prohibit women working for at least a month after their confinement. The Dutch government has introduced a bill which, in some respects, goes beyond, but in others does not come up to, the recommendations made by this commission.

### Aluminum.

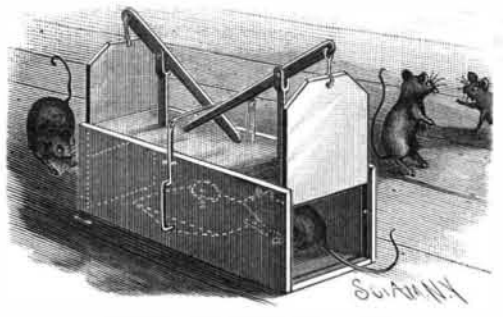
The process of Professor Curt Netto, of Dresden, now in experimental operation at Krupp's works, Essen, and in London, is a chemical process based on the displacement of aluminum from its ores by metallic sodium. The ore used is cryolite, a double fluoride of aluminum and sodium. This is ground to a fine powder, and is fluxed with common salt. The ore is then melted in a reverberatory furnace, and when quite liquid is run into a ladle. When in this condition ingots of solid sodium are forced to the bottom of the ladle, and are there held until they become volatilized, the work of a few moments only. The gaseous sodium rising through the molten cryolite displaces a part of the aluminum, which collects in a metallic form at the bottom of the ladle. The greater part of the slag is then skimmed off, and the remainder poured into an iron crucible to cool. When the mass is turned out, a solid ingot of aluminum is found at the bottom. The whole of the aluminum in the original charge of ore is not obtained at each operation, and the slag is therefore returned to the furnace with more cryolite. After the first charge the addition of salt is not required, as the slag serves the purpose of a flux.

For each pound of aluminum obtained there is required about 3½ pounds of sodium, so that it is important that this metal should be obtained cheaply. The Alliance Company, London, manufacture it at their works, the process, as described to us, being as follows, says *Engineering:* Pure caustic soda is melted in a pan, and then ground coke is stirred into it; 100 pounds of the mixture are ladled at a time into a long, narrow retort, lying in a furnace. The carbon effects the reduction of a part of the soda, metallic sodium being distilled off and caught in a condenser, while carbonate of soda is left in the retort. When the reduction is complete, the carbonate of soda is run off, and a fresh charge introduced, and so the process goes on. We were not informed what was the cost of the metal obtained, but it should not be greater than that obtained by the Castner process, which is stated to be 1s. a pound. Possibly it is less.

We saw a 5 pound ingot produced, the time occupied from charging the furnace to weighing the ingot being less than an hour. The cast was one of a series which had been going on all day, and was carried out by unskilled workmen with a small experimental plant. It is claimed that the metal produced is pure, and that in this respect it has an advantage over that obtained by the various electric processes. The cost of its production is set down at 6s. ($1.50) a pound, while the present selling price is 48s. ($12) a pound. Since aluminum bronze requires only 5 to 10 per cent of aluminum, while steel and iron only need to be alloyed with one-tenth per cent to obtain the full benefit of the combination, it is evident that aluminum at 10s. ($2.50) a pound would be a commercial article for which there would be a large demand.

### AN IMPROVED ANIMAL TRAP.

A trap designed especially for use as a mouse or rat trap is illustrated herewith, and has been patented by Mr. Charles H. Mittler, of Marthasville, Mo. Within the box is mounted a tilting platform, to be turned either way by a slight touch from the animal, thus releasing a hooked catch and freeing an arm which holds down levers, by which the sliding doors, closing openings at both ends of the trap, are held up. A pin on which to place bait is fixed in the face of the tilting block. These traps may be made of either wood or metal.



MITTLER'S ANIMAL TRAP.

[SIDEREAL MESSENGER.]

### Astronomical Notes.

*Mars' Satellites.*—It may be interesting to some of our readers to know how the tiny satellites of Mars look in the great Lick equatorial, as they have been observed night after night by Assistant Keeler, during the month of May. In conversation with a friend he recently said these minute bodies looked in the great refractor as bright as the companion to Polaris does in a three inch telescope. Mr. Barnard's estimate of their brightness in April was that they were equal to Jupiter's satellites when viewed with a glass of 1½ inches aperture. They are evidently easy objects to observe in the world's greatest refracting telescope.

*Map of Solar Spectrum.*—At the April meeting of the National Academy of Sciences, Professor Rowland, of Johns Hopkins University, presented two brief papers, giving further studies on certain spectra. With new and improved instruments, made at the university, it is claimed that he has succeeded in making a much more perfect map of the solar spectrum than his former one. Definition of the lines is better, and some single lines have been divided. He also claims the discovery that carbon is much more widely distributed in the sun than has previously been known.

*Dearborn Observatory.*—In a recent letter from Professor Hough, we learn that all the astronomical instruments belonging to Dearborn Observatory have been removed to Evanston, the new site of the observatory. Plans for the new building have been adopted, and its erection was to begin about the 1st of May, but the 18½ inch equatorial will not be mounted before January, 1889. The meridian circle has been placed in a temporary building, located 250 feet from the shore of Lake Michigan. Professor Hough says the lake seems to have no effect on nadir observations, at least a moderate storm does not disturb the images perceptibly. In case of a gale, he thinks it is possible that tremors would be felt. The site of the new observatory is to be 250 feet from the lake shore.

Professor Hough is now arranging for the time service for Chicago from his new location.

*Denver University Observatory.*—A recent letter from Professor H. A. Howe, of Denver University, Colorado, discloses the interesting fact that the observatory at that place is to have a new equatorial refracting telescope, the aperture of whose object glass will be 20 inches. This is good news for the university and for Professor Howe, who well deserves the recognition it implies. For so young a man it is a noteworthy stride in his favorite science to have a telescope that ranks fifth in size and power in the United States; for those at Lick Observatory, Washington, University of Virginia, and Princeton only now are larger. Another significant fact in this new enterprise is the altitude of the site, which has been chosen on the new "campus" of the university, about seven miles from the city of Denver, and is 5,000 feet above sea level. If memory serves us rightly, this site is higher than that of any other large telescope in the United States, the Lick site being next, at an altitude of 4,200 feet. The name of the generous donor of this large instrument is Mr. H. B. Chamberlin, of Denver, Colorado.

### Paper Pulp from Cotton Stalks.

For several weeks, says the Atlanta *Constitution*, there have been on exhibition in the office of the clerk of the Superior Court samples of pulp made of the hulls and stalks of the cotton plant. The pulp is as white as snow, and can be converted into the finest writing paper. It is regarded as valuable, and is the product of parts of the cotton plant hitherto deemed valueless.

The process by which it is made is new. It is a process by which the ligneous substances of the hulls and seed are dissolved. By this process over fifty per cent of the fiber is extracted from the hulls, which have been regarded as fit only for fuel in the mills or for feed and fertilizing purposes, and which were sold for four dollars a ton. These, converted into pulp, will be worth about forty dollars a ton. From the stalks usually left to rot in the fields this new process utilizes about thirty-eight per cent of fiber at a very small expense. It has been settled that there are fertilizing properties in the oil of the cotton seed, and it is asserted that the fiber will not decompose for six years and cannot be used as a fertilizer. This is why the woody matter eliminated from the stalk and hull is much more valuable as a decomposing fertilizer than the entire seed. By the same process the ramie plant and its troblesome cousin, the bagasse stalk, is met and overcome. By the decorticating process the fiber was crushed and torn out by a slow and expensive process.

In the new process the ligine is simply dissolved out, and the snowy films of the ramie and the tawnier threads of the sugar cane are coaxed out as easily as the infantile kitten to its milk.

### Alcohol.

Among the curious side issues of the current temperance discussion is the question whether alcohol is a natural product. This is, I believe, vigorously denied in some quarters. Alcohol, like bread, is manufactured artificially from a natural product. In each case fermentation, a natural process, is made use of. But while bread is known only as a product of manufacture, alcohol appears to be very-widely distributed in nature, though in extremely minute quantities. Nor is this at all surprising. If grapes or apples, or their juice, be exposed to the air, fermentation sets in, and the sugar and other carbohydrates are changed to alcohol. The ferments which cause the change are afloat in the air all about, and might not unnaturally attack similar compounds in other vegetable substances. Professor Muntz, of the National Agronomic Institute, in Paris, has, by refined chemical tests, discovered evidences of alcohol in cultivated soils, in rain water, in sea and river water, and in the atmosphere. He finds that vegetable moulds may contain considerable quantities, and it appears probable that the alcohol "originates in the soil, from the fermentation of the organic matters in it, and is thence diffused as vapor in the atmosphere." Another side issue of our temperance discussion is the so-called "Bible wine" theory, which maintains that the wine used in Palestine in the time of Christ was not alcoholic. I have been unable to find evidence that the composition of the juice of the grape, the laws of fermentation, or the practice in the making and using of wine were different in that country at that time from those in other countries, or in that country at other times; and believe it safe to say that the theory that Bible wine was different from other wine, that it had not the alcohol which other wines contain, is without any basis to support it, in the opinion of the student of science.—*Professor Atwater, in the Century.*

### Meeting of the American Association for the Advancement of Science.

The American Association for the Advancement of Science holds this year its thirty-seventh meeting at Cleveland, Ohio, from Wednesday morning, August 15, to Tuesday evening, August 21. The date of meeting has been advanced one week from that decided upon at the last assembling, on account of a gathering of Knights Templar to occur in Cleveland the third week in August. For all matters relating to membership, papers, and business of the Association, the permanent secretary should be addressed at Salem, Mass.