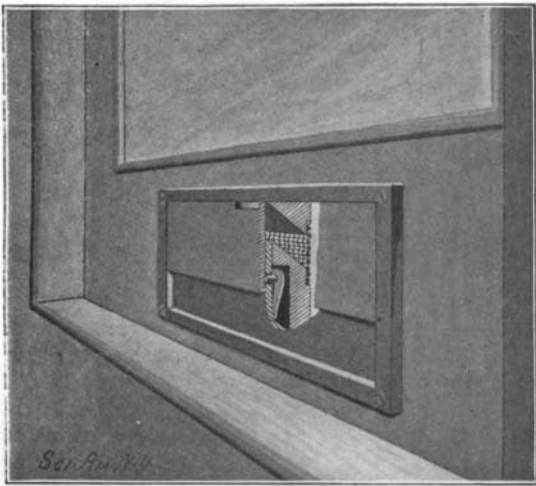


to fill the bore of the matrix without in any way touching the exterior. The reduced temperature of the matrix relatively to the molten material causes the latter to coagulate or chill upon the bore until a layer of the desired thickness has been secured. After this the matrix or mold is removed from the bath of molten metal, and the bore of the duplicate is finished by a reamer. The resulting duplicate is finally removed from the matrix or mold by shrinkage. The duplicates can be made much thinner than the ordinary original records, and therefore more economically, since the material removed by the reaming tool is used for the manufacture of subsequent duplicates.

**AN ADJUSTABLE VENTILATOR FOR WINDOWS.**

A simple ventilator for car-windows or other windows, which affords convenient means for adjustment



**AN ADJUSTABLE VENTILATOR FOR WINDOWS.**

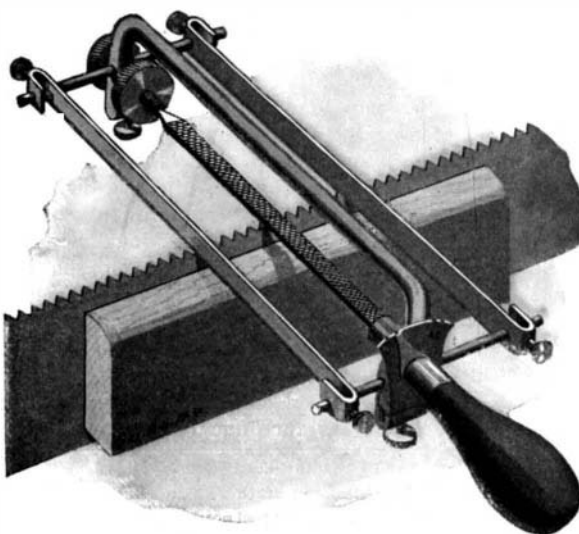
to graduate the opening of the ventilator so as to open it partially or entirely, is the subject of the accompanying illustration. The inventor of the window is David E. Werts, of Grants Pass, Oregon.

The sash is held to slide vertically in the window-frame; and the improved ventilator is placed in the lower rail of each sash. This lower rail has a horizontal slot leading outwardly and downwardly. On the inner side of the sash-rail a recessed guard-frame is secured, which frame is slotted to register with the slot of the sash-rail. The exterior opening of the slot is covered with a woven-wire cloth. Slidable in the recess of the guard-frame is a gate, upon which a plug bears. The plug projects from the free end of a flat spring secured by one end in a cavity in the sash rail, and through a perforation in the guard-frame. It will be seen that the impinging of the spring-pressed plug on the gate will retain the gate at a desired point of open adjustment. The relative position of the plug is such as to adapt it to project its free rounded end through the perforation in the guard-frame for a short distance, so as to support the gate when elevated sufficiently to close the sash-slot completely.

The improved ventilator is of special value as a means for ventilating passenger cars as well as bedrooms, the air being admitted in volume which may be exactly graduated so as to meet all sanitary requirements and to avoid any excess which would cause an improper air current in the room or car.

**AN IMPROVED SAW-SHARPENER.**

A novel device for sharpening the teeth of saws, which embodies means for deepening the cut and



**AN IMPROVED SAW-SHARPENER.**

changing the pitch of the saw-teeth, is the subject of an invention for which Ira L. Bulson, of Jacksonville, Fla., recently received a United States patent.

The device consists of an arched frame-bar, the depending limbs of which are slotted. In one limb a screw-plug is fitted, carrying two jam-nuts embrac-

ing the limb; and in the other limb-slot a shank is fitted on which a handle screws. Between the shank and the screw-plug the saw-file is held. In order to regulate the depth to which the file shall cut, two gage-bars are provided, located on opposite sides of the frame-bar and adjustable on cross-bars carried by the depending limbs. By means of set-screws operating in conjunction with clips, coacting with the depending limbs of the frame-bar, these gage-bars are adjusted in a vertical direction. In sharpening the teeth of the saw, in the usual manner, it is evident that these gage-bars will limit the depth to which the teeth are cut, so that all the teeth of the saw are uniformly cut. In order to indicate the inclination of the file, the instrument is provided with a gage comprising a graduated face carried by the shank and a movable finger free to travel over the face to indicate the position of the file.

The improved implement is available for use either on cross-cut or ripping saws, and does not require expert handling to secure good results. The gage-bars limit the depth of cutting, which may be nicely graduated by the adjustment of the set-screws, and the rocking adjustment of the index-finger controls the degree of angular inclination given to the body of the file-bar, so that teeth of exact size and pitch can be formed on a saw-blade or defective teeth renewed and rendered perfect.

**Requisites of the Perfect Car Coupler.**

Many inventors will probably remember the paper read some three years ago by Mr. Pulaski Leeds before the Central Association of Railroad Officers on the subject of "Car Couplers." Mr. Leeds began his paper by asking: "Does the present style of vertical-plane coupler meet all requirements? Has it come to stay?" Mr. Leeds was of the opinion that the vertical-plane coupler was by no means a perfect contrivance, and was still more of the opinion that it had come to stay. He enumerated the conditions and requirements of service; and these he states are: First, that the concussion should be evenly and squarely met on a central line; second, that the pulling strain should be on a central line to avoid all tendency to crowd the flanges against the rail; third, that the connection should be so flexible that there should be no unnecessary friction at any time or difficulty in coupling on any practicable curve; fourth, that the device should be capable of having its strength increased to meet future requirements of heavier motive power; fifth, that it should be always operative; sixth, that there should be as great a uniformity as there was in the link and pin.

Mr. J. B. Thomas now comes to the fore with a paper presented at the St. Louis Railway Club, in which he further discusses the interesting question first opened by Mr. Leeds. The increase of break-tivos and in the wear of truck-wheel flanges, together with the need of improvements in draft-rigging, have shown that the present coupler may be considered the direct cause of many accidents. In every scrap-heap in the railway yards many couplers may be seen, the shanks of which are broken anywhere from two to eight inches back from the shoulder. From templates constructed according to the strict Master Car Builders' rules it is found that the greatest angle obtainable by two cars in rounding a curve without impinging against the side is 10 degrees. When a greater angle than this is obtained the side motion of the car may produce lateral pressures of from 3,000 to 57,000 pounds on the couplers.

In order to determine the relative positions of two freight cars standing on one of the curves found in the freight yards at St. Louis, Mr. Thomas made an interesting investigation. Of seven sets of intersecting lines of as many pairs of cars, the least angle produced by any two of these lines was 18 degrees. The greatest angle recorded was 28 degrees. None of the cars was over 35 feet long. Any two 40-foot cars would have increased the angle on any of these curves 4 degrees.

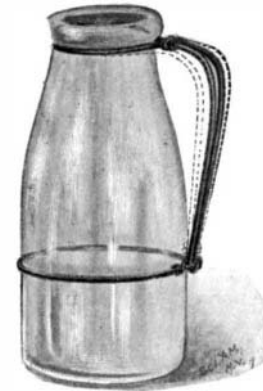
In the face of these facts Mr. Thomas believes that a radical departure must be made from the style and dimensions of the couplers now in general use. Their continuation means worn rails, split draft-timbers, damaged carrier-irons, worn wheel-flanges, increased tractive resistance to trains, and an increased number of break-in-tivos.

Mr. Thomas has himself invented a coupler for the purpose of avoiding many of the evils which have been cited. He knows that he has not a perfect coupler; but, it possesses certain essentials, nothing short of which will satisfy the demands of the present and the future. Since these essentials may be of some interest to prospective inventors of car-couplers we give them for what they are worth. The essentials are: First, that the coupler will couple on any practicable curve known in railway construction, regardless of any difference in the cars to be coupled; second, by yielding to the varying motion of the cars in rounding a curve, the coupler avoids that terrible strain which cuts away the flanges of wheels, destroys

the draft-timbers, and injures the car; third, the coupler is always operative; fourth, it confines the natural wear to certain small parts whose total weight is about 30 pounds, besides which, these parts being relieved from excessive strain by the drawhead's flexibility will wear only about one-fourth as rapidly as will the corresponding part of the coupler now in use.

**DEVICES CURIOUS AND INTERESTING.**

**BOTTLE-HOLDER.**—A detachable bottle-holder is an appliance which will commend itself to any house-

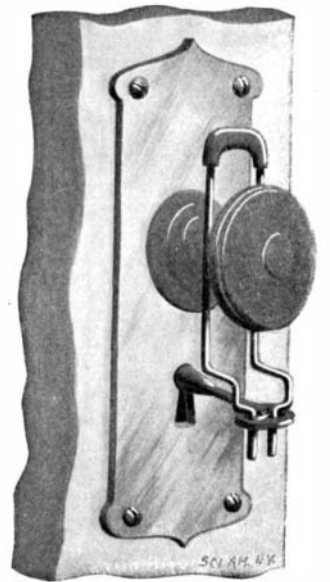


**MILK-BOTTLE HOLDER.**

wife who knows how difficult it is to grasp the stout glass bottles in which milk is sold in our large cities. The improved holder which we have shown consists of a piece of wire, bent to form a closed and an open loop. The closed loop embraces the body of the glass bottle, and the open loop the neck. The open loop is made to hug the neck of the bottle by means of a clasp embracing that part of the holder

which is to be grasped by the hand. The clasp is slipped downwardly on the handle-part in order to release the neck portion of the device and to permit the holder to be removed. Mr. Wilfred H. Goddard, of Chelsea, Mass., is the inventor of the holder.

**KEY-KEEPER.**—The burglar who tries to pick the lock, the key of which is held in the manner shown in our illustration, will probably be disappointed. His efforts would be very effectually frustrated by a key-keeper consisting of a pair of vertical arms having extensions which fit within the ring of the key, so that it is practically impossible to turn the key from the outside. The key-keeper is the invention of Albert B. Lang, of St. Louis, Mo. The invention is obviously a simple and efficient appliance.



**A KEY-KEEPER.**

**HILL-CLIMBING SHOE.**—A form of shoe which is rather peculiar is the invention of John E. Fenno, of Hoisington, Kan. Mr. Fenno's shoe is designed particularly to facilitate walking when ascending hills.



**HILL-CLIMBING ATTACHMENT FOR SHOES.**

The invention comprises a vertically-extensible heel-portion arranged to elevate the heel so that the sole of the foot will be in a horizontal position in advancing uphill. The inventor believes that hill-climbing,

by means of his invention, will be a far easier matter than formerly, since a more erect and comfortable attitude will be preserved with less fatigue.

**MARSH-SHOE.**—A Canadian inventor, Mr. Albert Drouillard, of Windsor, Ontario, has invented another peculiar shoe, which is to be used by hunters in pursuit of game over swampy ground. The shoe consists of a flexible disk formed with a rigid rim which prevents slipping. Straps secure the sole of the boot to the disk. Furthermore, an air pipe communicates with the under side of the disk with the heel. The body of the disk acts as a flexible diaphragm, and its action in lifting up the heel is similar to that of a diaphragm-pump. Air is sucked in through the pipe and conducted beneath the disk to permit the ready withdrawal of the marsh-



**MARSH-SHOE**

shoe. The inventor claims that a hunter may step into deep, miry ground up to his knees, and that the air will still be drawn in, so that extrication will be a matter of no difficulty.

**A Method of Repairing Burnt-Out Incandescent Electric Lamps.**

It is a well-known fact that the filament of an incandescent bulb is partially volatilized by the electric current. The particles of carbon volatilized cling to the inner surface of the bulb and thus prevent, to a certain extent, the transmission of light through the glass. Moreover, the resistance of the filament is very considerably increased, and the light efficiency of the lamp correspondingly decreased. Many attempts have been made to use the bulbs of these burnt-out lamps over again; and in many instances the inventors have suggested the withdrawal of the old filament. Obviously, this is a costly process and more difficult than the manufacture of the original lamp.

An English inventor, Mr. Ferdinand Fanta, of London, contrary to the general belief, holds that the entire body of the filament does not volatilize and lose its lighting efficiency, but deems it more probable that the core of the body of the filament, after having been in use for several hundred hours, is often in a better condition than when originally inserted in the lamp. This he accounts for by the fact that the original carbonizing process which the filament must undergo before its insertion in the bulb, is performed too rapidly, and that the process known as "reinforcing" or "flashing" of the filament is carried out under unsatisfactory conditions. In most instances, according to Mr. Fanta, these conditions are entirely at variance with those under which the filament is used in actual practice. The result is that, when the filament is used in a more or less perfect vacuum, the atmospheric air still retained or imprisoned in the pores of the filament becomes available for combustion, so that the outer coating of the carbon of the filament slowly combines with the air. The carbon monoxide vapors thus formed are condensed on the inner surface of the glass bulb, which acts as a condenser. In order to restore its lighting efficiency to an electric incandescent lamp which has reached this stage, the inventor considers it first indispensable to free the bulb of its carbon deposit, and to redeposit the carbon on the partly-burned or spent filament.

In order to carry out these ends, Mr. Fanta first of all removes or cuts away the small protruding point of glass formed on the bulb after it has been hermetically sealed. In place of the point, a small glass tube some four or six inches long is fixed to the glass. The bulb is then heated interiorly, preferably by a flame applied successively over the surface, to burn the carbon deposit on the inner glass surface. This operation is facilitated and rendered practicable at temperatures not injurious to the integrity of the glass and to the preservation of the capping of the filament, by causing previously heated air to circulate freely in the bulb while the gases resulting from combustion are simultaneously drawn off by means of a pump. After a short period of application of this cleansing process, the glass of the bulb appears quite clear and free from carbon. The bulb is now ready for the process of depositing carbon on the filament. For this purpose, having created as perfect a vacuum as possible in the bulb, the inventor introduces, by mechanical circulation under controllable pressure, a gaseous hydrocarbon (purified coal-gas) with an admixture of a certain quantity of free atmospheric air, the proportion and percentage of which varies in accordance with the voltage and the candle power of the filament, and with the conditions of the vacuum in the lamp to be treated. An electric current is now passed through the filament. Carbon deposits on the filament; and obviously the resistance diminishes while the candle power increases. Since the object is to restore the carbon filament to its original smaller resistance and higher candle power, the operation is begun with a variable resistance inserted in the main regenerating circuit. Gradually this resistance is increased simultaneously with the passage of the carbon on the filament to compensate for the increasing section and to reduce the resistance of the filament. A photometer is used to standardize the light. When the voltage and candle power have reached the desired point, the operation is stopped. The bulb is now exhausted and sealed in the usual well-known manner.

Mr. Fanta has found that the proportion of atmospheric air and the gaseous mixture should vary from 3 to 10 per cent, according to the nature or condition of the filament to be "flashed," the percentage of either being smaller for filaments of low candle power than for filaments of high candle power. With a burned filament of irregular cross-section and in poor condition, the percentage of air must be kept at the lowest value until the filament has been reinforced at its weakest parts. Not until then can the percentage of air be increased.

**Legal Notes.**

**Recent Patent and Trade Mark Decisions.**

Justice Colt, of the United States Circuit Court of Appeals for the First Circuit, recently handed down a decision in the matter of Swain vs. the Holyoke Machine Company, in which public sale or use prior to the application for a patent is discussed at some length. Asa M. Swain, the complainant, filed an application on January 10, 1881, for a turbine water-wheel, the patent on which was issued fourteen years later, on March 12. The court below dismissed the bill on the ground that there had been an unrestricted sale of the machine embodied in the first three claims, more than two years prior to the application. The fact that the machine had been thus sold was clearly brought out before the Circuit Court. To overcome the bar of the statute, the complainant sought to prove that the sale was for the purpose of experiment only, and that the first machine used publicly was incomplete.

The court, however, found that the machine alleged to be incomplete contained the invention in its finished form, and that the inventor could not relieve himself from the consequences by showing that it was installed with slight imperfections. The court was clearly of the opinion that the inventor intended to sell, and did sell, with a full knowledge and understanding of his invention, a machine that embodied his whole invention, and that the date at which this machine was sold was two years prior to the time at which his application for his patent was filed. In the light of these circumstances the court found that the machine was not merely an experimental device, and that the patent granted to Swain was invalid. The fact that the inventor had failed to test the efficiency of his machine or conducted any tests after it was put in use indicated that no experiments had been made.

A case of equal interest to inventors was decided in the Ninth Circuit of the Circuit Court of Appeals, Justice Gilbert delivering the opinion of the Court. The appeal in this case (Johnston vs. Woodbury) was taken from the final decree of the Circuit Court, dismissing the appellant's bill in a suit brought for infringement of the first two claims of a patent on an ore concentrator. The invention was an ore concentrator, the novel feature of which was claimed to be an endless belt of canvas or of rubber, having integral raised edges traveling longitudinally over two drums and at the same time having a lateral shaking motion. Finely crushed sulphurets mixed with water to form a thin pulp are fed to the surface of the belt. It is the purpose of the lateral motion combined with the longitudinal movement to separate the sand from the sulphurets and to cause the sand to travel downwardly and pass over the tail end of the belt, while the sulphurets are carried up and over the head of the belt into a tank. It was established on trial that to accomplish this result the pulp must be evenly distributed over the surface of the belt. The defense principally relied upon, and sustained by the Circuit Court, was that the appellant's patent lacked invention, in view of a prior patent, in which a construction was described that could be made to operate as the appellant's invention, although there was nothing to indicate that the patentee contemplated such operation. It appeared from the evidence that those who used the patented invention modified it to secure the result of the appellant's invention, for which reason it was held that the appellant could not be regarded as the first inventor. Although the persons who used the prior device did not place the supports of their belt-frame at the precise angle preferred by the appellant, and while they did not contemplate or specifically desire to obtain an oscillatory motion of the belt, nevertheless they obtained such a movement, and what they did, the court held, must be regarded as an anticipation of the appellant's invention. The decision emphasizes one of the most important principles in American patent law—a principle by which it is held that the inventor of a species is the inventor of the entire class to which that species belongs, although he may be unaware of the actual extent of the applicability of his invention.

The proprietors of Pears' soap, Messrs A. & F. Pears, Ltd., sued the George S. Pears Soap Company, to restrain them from using the word "Pears." Justice Hook in the United States Circuit Court for the Western Division of the Western District of Missouri, granted a temporary injunction to stop the business of the defendants. The temporary injunction has since been made permanent by Judge Philips, of the same court.

In his oral opinion, Judge Hook reviews the history of the makers of the original Pears' soap and finds that they have spent large sums in advertising their product, and that there has been a continuous and consistent effort to make the name "Pears" a most prominent feature in the system of advertising. The court admitted that the name Pears was not a lawful subject of a trade-mark, technically considered; but it was undoubtedly true that, when a name had acquired

a secondary signification, so that its use by another would amount to a fraud upon the public and upon those properly entitled to the name, steps should be taken to prevent the fraudulent use of the name.

It seems that in 1898 a corporation which styled itself the "George S. Pears Soap Company" was organized under the laws of the State of Missouri. One of the incorporators was a barber, George S. Pears by name, who seems to have been the leading spirit of the company. As a prerequisite to lawful incorporation the laws of Missouri require a payment of a certain percentage of the authorized capital. Although the incorporators certified to such payment, nothing whatever was paid by the stockholders into the treasury beyond the actual fees and expenses of preparing the documents relating to the incorporation. Pears insisted that his name should be given to the corporation. He testified that a certain unnamed friend had given him formulæ for the manufacture of soaps.

It appeared from the testimony of persons connected with a well-known soap manufacturing company of Kansas City that it had furnished the George S. Pears Company with unstamped bars of glycerine soap, and that these soaps were not made according to any formulæ furnished by George S. Pears or any one else connected with him. It seems that after these soaps had been purchased in Kansas City they were cut and pressed by the George S. Pears Company into oval shapes similar to the English soaps, and then wrapped and boxed for the trade. In the stamping of the soap, and upon the wrappers and the boxes the word "Pears" was made a prominent feature. The complainant and its ancestors had sold scented and unscented glycerine soaps. The defendant placed upon the market similar soaps.

Although the Court admitted that there were differences in the marking and dressing of the soaps of the two companies, yet it was thought that the method pursued by retail druggists in handling and exposing soaps for sale would lead an unsuspecting purchaser to mistake the English soap for the other. Indeed, testimony showed that such was the case.

After having carefully examined the proofs the Court was convinced that "the very organization of the George S. Pears Company was conceived with a fraudulent and unlawful purpose, and that the design of the persons connected therewith was to trade upon the name, fame and reputation of the complainant. . . . The differences in the soaps of the two companies and the dressing marks and boxes are not sufficient to prevent any imposition upon the public or an invasion of complainant's rights. The use of the word 'Pears' in designating the defendant's soap is alone sufficient . . . to deceive the ordinary customer."

The decision is entirely in line with that rendered in the Rogers Silver Plate case and similar causes.

On October 30 last the Circuit Court of Appeals for the Second Circuit handed down a decision reversing the decree of the Circuit Court in the case of Brickell et al. against the Mayor, etc., of the city of New York. Few patented devices have been the subject of more legal decisions than this feed-water heater. When Judge Coxe, on June 7, 1900, rendered a decision awarding the complainants \$951,070 everyone heaved a sigh of relief. It was hoped that the Brickell matter had finally been disposed of. This suit was commenced over thirty years ago to recover damages and profits for the use by the city of New York on its steam fire engines of a feed-water heater covered by Letters Patent No. 81,132, granted August 18, 1868, to William A. Brickell. The judgment is now set aside for errors in determining the amount of profits for which the city was liable, and a new accounting is ordered. Judge Wallace, who wrote the opinion of the Circuit Court of Appeals, holds that while the patent is valid, its scope must be very much limited, and in view of these limitations it may be considered doubtful whether the complainant will ever obtain a substantial recovery against the city. The Brickell feed-water heater, strange to say, is not the only device which the Fire Department of New York has been charged with using unlawfully. The Knibbs' valve, for which judgment against New York city was handed down a few months ago for a sum of nearly a million dollars, has also been used by our Fire Department without being properly entitled to such use, if the plaintiffs are to be believed. Both of these cases have dragged along year after year. The Brickell case has been exhaustively discussed in the SCIENTIFIC AMERICAN for June 10, 1899.

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