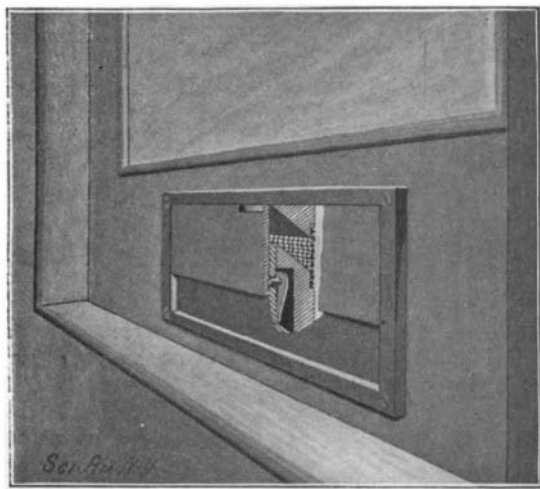


to fill the bore of the matrix without in any way touching the exterior. The reduced temperature of the matrix relatively to the molten material causes the latter to coagulate or chill upon the bore until a layer of the desired thickness has been secured. After this the matrix or mold is removed from 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.**

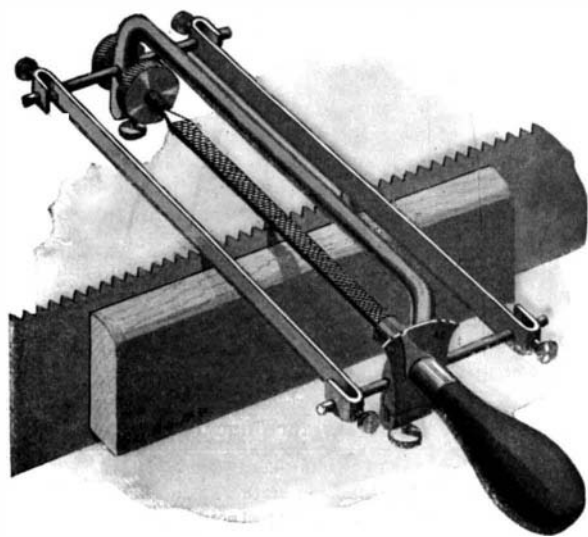
to graduate the opening of the ventilator so as to open it partially or entirely, is the subject of the accompanying illustration. The inventor of the window is David E. Werts, of Grants Pass, Oregon.

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.

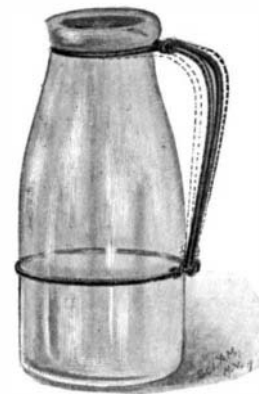
In the face of these facts Mr. Thomas believes that a radical departure must be made from the style and dimensions of the couplers now in general use. Their continuation means worn rails, split draft-timbers, damaged carrier-irons, worn wheel-flanges, increased tractive resistance to trains, and an increased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

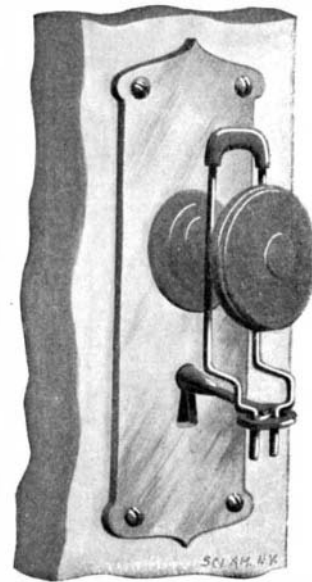


**MILK-BOTTLE HOLDER.**

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**