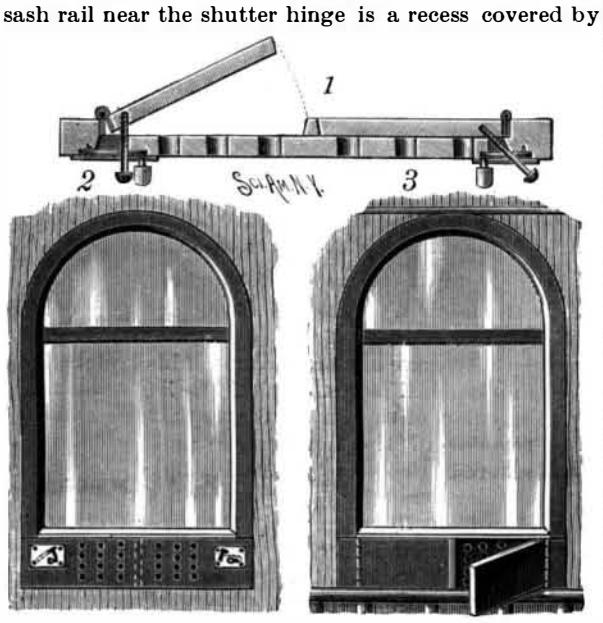
AN IMPROVED VENTILATOR FOR RAILWAY CARS.

The illustration shows a device for attachment to car windows, whereby air may be allowed to enter from either side without creating a draught, and dust and cinders will be effectually excluded. It has been patented by Mr. Robert E. Burke, of Phillipsburg, N. J. Fig. 2 is an inside view of the device applied to the lower rail of the window frame, Fig. 3 showing one of the shutters open, and Fig. 1 being a horizontal sectional view. The ventilators are preferably located in the bottom rail of the window frame, side recesses separated by a central rib being formed in the outer face of the rail, and a shutter being hinged to the outer end of each recess. In each recess are openings communicating with the interior of the car, and in the sash rail near the shutter hinge is a recess covered by

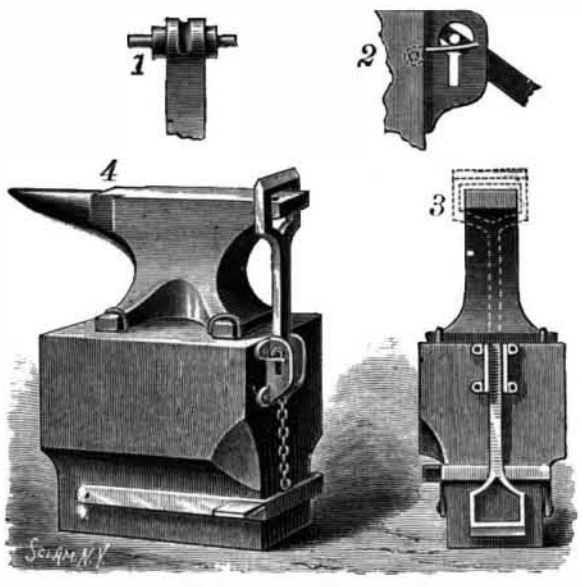


BURKE'S VENTILATOR FOR RAILWAY CARS.

a plate having a horizontal and a vertical slot, in which operate a pin and a latch. The pin passes at an incline into the hinged end of the shutter from the rear, so that the force applied in opening the shutter will be exerted in the line of its direction of movement. When the device is applied to railway cars, the shutter at the forward side of the window only is opened, the cinders, dust, etc., being then deflected from the opening. This device can be readily attached to a car after it has been built, and can be conveniently manipulated from the inside without raising the window. It is also adapted for attachment to the windows of dwelling houses, etc.

AN ANVIL ATTACHMENT.

The invention illustrated herewith provides means whereby metal may be quickly and easily bent and cut off upon the anvil, and forms the subject of a patent issued to Mr. Charles M. King, of Downieville, Cal. Figs. 3 and 4 are side and end views of an anvil having such an attachment. A U-shaped lever having a treadle at one side is pivoted to the sides of the anvil



KING'S ANVIL ATTACHMENT.

block in a cut-away portion near its base, a chain from this lever extending upward to a grooved disk on the end of an arm pivoted in a bracket. Fig. 1 shows the pivot end of this arm, and Fig. 2 the manner in which it is held and pivoted to the anvil block. The arm has at its free end a rectangular-shaped grip large enough to clasp the end of the anvil and admit a fair sized strip or bar of metal between it and the face of the anvil, and is capable of vertical movement in slots in slide flanges of the bracket in which it is pivoted. Springs at the side of the bracket hold the grip above the face of the anvil, to allow room for the insertion of the metal, until the treadle is depressed. When the foot is placed upon the treadle, the arm is raised to bring the grip into position above the face of the anvil, and by further pressure upon the treadle the grip is brought firmly down upon any metal which may be between it and the anvil, or, if there is no metal there, the grip may be brought down to a solid bearing upon the anvil, so that the triangular upper face of the grip may be used to cut the metal upon. When the grip is not in use for either of these purposes, its arm is tipped down out of the way, at the end of the anvil block.

Brittle Bodies.

Under the head, "What are brittle bodies?" Prof. Frederick Kick recently communicated the preliminary results of some very interesting experiments in *Dingl. Polytech. Journal*, 274, 405. He starts with two theses:—(1) Those bodies of substances are brittle which, in order to become ductile or plastic, must be subjected to a high pressure, acting uniformly from all directions; (2) the hardness of a substance may be determined with numerical accuracy by means of its shearing stress if every bending and every fluxion of the material particles be excluded. To substantiate the first thesis, the following experiments were made with pieces of gypsum, steatite, rock salt, and calcite, all of which are, under ordinary conditions, very brittle. The test materials were cut and ground into prismatic shape. A suitable piece of ordinary iron gas pipe was closed at one end with a well-fitting plug, and filled with molten shellac, avoiding carefully any formation of bubbles. Into this were immersed the test prisms, which had previously been coated with shellac solution, and after filling up the remaining space with shellac, the top was closed by a second plug. The pipe was allowed to cool slowly for several hours, and then bent into U-shape. In dilute nitric acid the iron pipe was dissolved, leaving the shellac core unaffected. This was dissolved in alcohol, leaving the bent prism of rock salt, steatite, etc., in perfectly coherent shape. The softer the enveloping material, the better the results. The author constructed then a simple but effective apparatus, in which oil was the enveloping medium instead of shellac, and succeeded in altering the shape of the most brittle substances without affecting transparency or coherence. In regard to the second thesis, the author's experiments are yet few in number. It seems true that the hardness and shearing stress are directly proportional, but more experiments are necessary to establish the thesis as a law of nature. Shellac and tin are substances of widely differing nature and composition. Their hardness, however, is equal, and Professor Kick finds for both the same shearing stress, *i. e.*, 2·6 kilogrammes to the square centimeter.

AN IMPROVED ADJUSTABLE LADDER.

A ladder which may be conveniently adjusted to the inequalities of the ground or other support, and which may be compactly and readily folded when not in use, is represented in the accompanying illustration, and has been patented by Mr. Pierre F. M. Burrows. The body of the ladder has four standards arranged in pairs to form the sides, and the front and rear standards of each side are filled in at their bottom ends by a block, rigidly attached to the rear standard and adapted to slide in a longitudinal groove in the front standard. The steps and the front and rear standards are held in position by bearing rods attached to the standards by a bolt or screw passed through eyes in the ends of the rods. The under surface of the steps have a transverse groove near each end adapted to receive the bearing rods, to which they are held by staples, and on the under side of the upper step is a longitudinal attached brace. The steps being thus pivotally attached to the bearing rods, the standards and steps may be readily folded close together, and when the ladder is set up the pivoted steps and rods give adjusting movements to the standards. The back stays or braces are each composed of two parallel and spaced strips, the limbs being made to interlock or cross each other, and each limb having near the top an adjusting stop, the stops being fixtures adjustable by thumb nuts according to the surface of the ground. The upper ends of the limbs are connected to the rear standards by a swivel or universal joint, and the stays are limited in their movement by a length of chain connecting them with the standards. When the ladder is to be used, it is set up perpendicularly to be opened out from its closed position, and the back stays spread from the bottom as far as allowed by the stops, the latter being adjusted accordingly when the ground is rough. When such adjustment has been properly effected, the ladder is designed to be more safe and rigid, the greater the weight of the person ascending it and the higher the ladder is mounted.

For further information relative to this invention, address Mr. P. F. M. Burrows, No. 317 Victoria Arcade, Auckland, New Zealand.

AN IMPROVED PIPE CLAMP.

This pipe clamp is designed for pipes through which a fluid passes under high pressure, serving for strengthening parts of the pipe that have become weak and for mending ruptured and broken pipes. It has been patented by Messrs. William Walker and John B. Davis, of Jermyn, Pa. The sections of pipe are united at their ends in the usual way by a socket, and a clamp to surround the joined ends is formed of two semi-cylindrical sections, with flanges adapted to receive bolts to fasten the two sections together, a packing being placed between the flanges. Each of the clamp sections has on each end a semi-annular flange, and when the pipe line extends horizontally the upper section has a conical aperture through which the molten calking material is introduced. When the pipe line is vertical, the calking material is poured through the upper end of the pipe clamp. In applying the clamp over a weak spot or disconnected sections of pipe the openings at the ends of the inclined flanges are closed by clay or other suitable packing, when the molten metal is poured to fill the interior space formed around the pipe by the clamp sections. When the molten metal has hardened, the clay or packing is re-

WALKER & DAVIS' PIPE CLAMP.

moved and the operator calks the edges in the flanges with suitable tools.

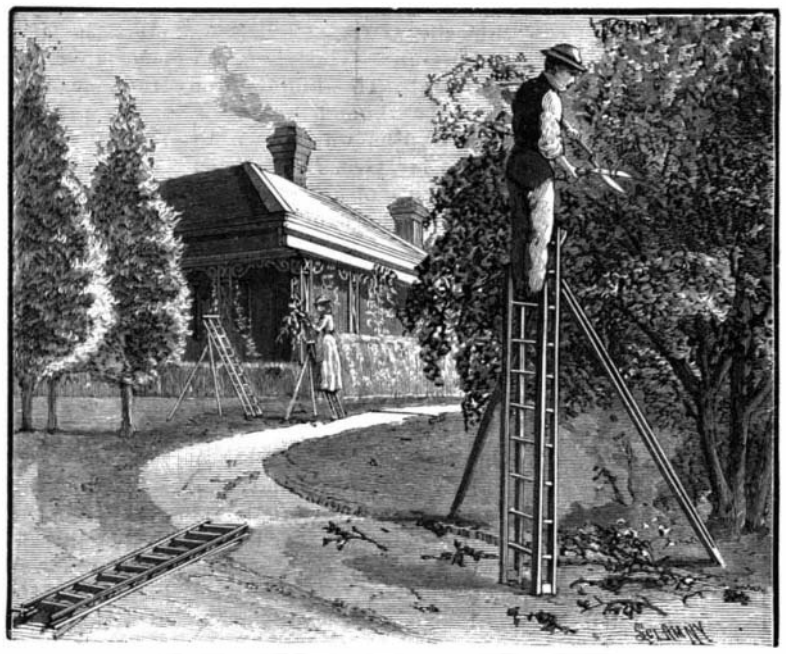
Naval Armaments.

It appears from the British navy estimates that the present Board of Admiralty have substituted as the main armament of all the battleships they have laid down guns of a smaller caliber, for they consider the 110 ton gun too large and weighty for general use, although, so far as penetration and destruction are concerned, it is the most powerful weapon in the world. Three ships only will be armed with them.

The 67 ton gun carries an armor-piercing projectile of 1,250 lb. weight, capable of penetrating at 1,000 yards a steel plate of 24·3 in. in thickness, with a bursting charge of 85 lb. in the common shell. The 110 ton gun carries an armor-piercing projectile of 1,800 lb., capable at 1,000 yards of penetrating 27·4 in. of steel, with a bursting charge of 180 lb. in the common shell.

Red Glass.

A new red glass has been recently produced in Germany. Besides its use for the manufacture of bottles, goblets, and vases of various kinds, it will be found applicable in photography and in chemists' and opticians' laboratories. This glass is produced by melting in an open crucible the following ingredients:—Fine sand, 2,000 parts; red oxide of lead—minium—400; carbonate of potash, 600; lime, 100; phosphate of lime, 20; cream of tartar, 20; borax, 20; red oxide of copper—protoxide—9; and bioxide of tin, 13 parts. By a single melting a transparent red glass is said to be obtained of a very fine quality, of which various objects can be manufactured directly, without the necessity of a second heating to intensify the color.



BURROWS' FOLDING ADJUSTABLE LADDER.