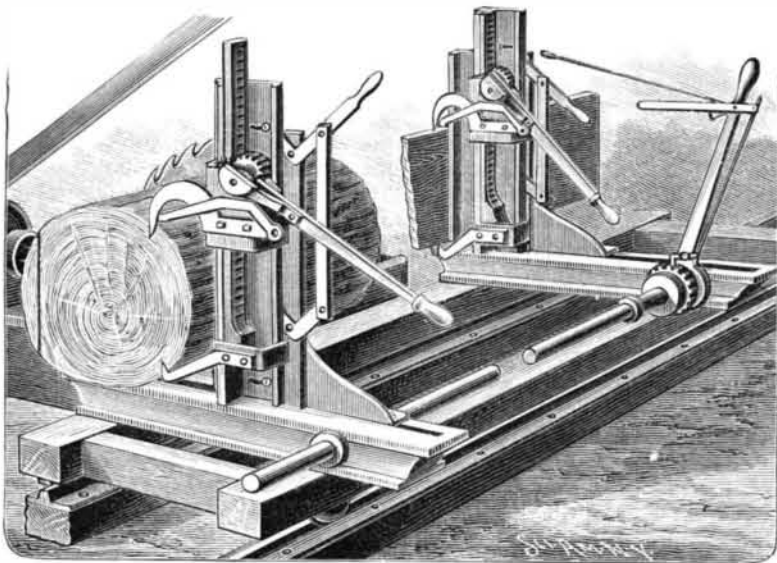


Industrial Uses of Carbonic Acid.

At Krupp's works, at Essen, liquid carbonic acid, CO₂, is used in heavy gun making. Krupp discovered that by casting steel under pressure (some 1,000 lb. to the square inch), and rapidly cooling the metal by means of carbon dioxide, he could obtain heavy pieces free from defects. The pressure of 1,000 lb. to the inch is obtained by heating the vessel containing the liquid



BENSON'S SAW MILL DOG.

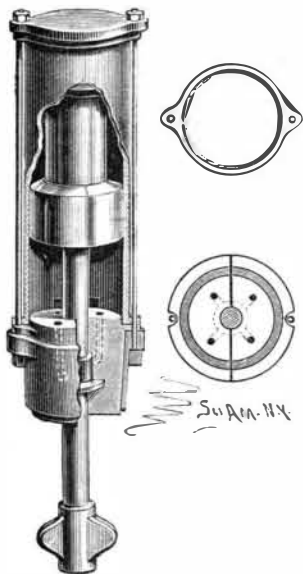
AN IMPROVED SAW MILL DOG.

The illustration represents a saw mill dog designed to permit of freely moving the log up or down in case of knots or crooks striking the collar of the saw, without releasing the saw. It has been patented by Mr. Marcus E. Benson, of West Plains, Mo. On the head block is a standard on which is held a horizontally adjustable frame, the frame having upper and lower slots through which bolts are screwed into the standard. To conveniently move the frame to adjust the dogs, upper and lower pivoted levers are employed, connected together by a link, the upper lever having a handle for conveniently actuating both levers. The frame has flanges forming guideways engaged by a vertical sliding carriage carrying the upper dog, and on the carriage is a transverse shaft having a gear wheel meshing with a rack sliding vertically on the inner face of a flange of the frame. The rack is supported at its lower end on a coiled spring, and on the lower end of the rack is secured a carriage similar to the upper one, and carrying the lower dog. A lever is loosely fulcrumed on the shaft carried by the upper carriage, and on this lever is held a pawl adapted to engage the gear wheel, there being held on the opposite side of the lever a spring-pressed arm with segmental edge adapted to be pressed in contact with a similar edge on the carriage.

up to 30° Centigrade. It has been found by experiment that by heating up the liquid to 2,000° Centigrade, a pressure of 18,000 lb. to the inch may be obtained. The Krupp guns are built up of three cylinders, shrunk one on another. The cold portion over which the heated cylinder is being forced is kept cool during the operation by means of the cold resulting from the expansion of the liquid into the gaseous form. In like manner, in breaking up an old gun, the steel core is, by the same means, reduced to a very low temperature, the shrinkage due to which loosens the core and allows it to be drawn out.—*Industries.*

AN IMPROVED CYLINDER HEAD FOR ROCK DRILLS.

The cylinder head represented in the illustration is one which can be used for fibrous or leather packing, permitting it to be employed on drills driven by steam or air. It has been patented by Mr. George J. Slining, of Negaunee, Mich.



SLINING'S CYLINDER HEAD FOR ROCK DRILLS.

It is applied on the usual rock drill cylinder, and has a bushing made in two equal parts and provided with an annular flange fitting on a corresponding flange of the cylinder. The exterior of the bushing is made slightly conical, and on it fits a yoke with apertured lugs, as shown also in one of the small views, through which pass bolts which also pass through corresponding recesses in the flange of the bushing and are secured to the head on the other end of the cylinder.

In the center of the bushing are recesses in which is placed the packing, provided with an annular flange fitting a corresponding annular recess in the bushing. Recesses in the bushing and in the packing form channels which extend inward and open at their inner ends into the interior of the cylinder, as shown in one of the small views, so that the compressed air or steam may pass through the channels and press the packing firmly in contact with the piston rod. The construction is very simple and durable, and the head can easily be removed for inserting new packing when desired.

For further information relative to this invention address the patentee, or Mr. Samuel Mitchell, Negaunee, Mich.

Philadelphia the Great Carpet City.

The Philadelphia Press says the textile industry is the greatest of all industries in Philadelphia, and the largest branch of that industry is carpets. The trade has been in a flourishing condition, and in one ward in the city more carpets are made than in all England combined, the former home of the industry. There are at least one hundred and fifty mills in the city producing goods worth probably \$40,000,000 a year, employing fully seventeen thousand persons.

mental edge adapted to be pressed in contact with a similar edge on the carriage.

On the shaft is also loosely fulcrumed a cam, supported on an arm fastened to the lever, so that the cam turns with the swinging of the lever. In operation, by the moving of the lever into a vertical position the pawl is disengaged from the gear wheel, and the carriage may be moved into its uppermost position. When the lever is turned horizontally, the pawl engages the gear wheel, when the weight of the carriage causes the rack to slide downward until the lower dog is below the top of the head block, permitting the log to be rolled thereon. When the lever is again turned vertically to disengage the dog, the rack is pushed upward by the coiled spring at its lower end, moving the lower dog with its point into the log, and permitting the operator to move the upper carriage so that the point of the upper dog engages the log from the top, the swinging downward of the lever causing the points of both dogs to be pressed into the log. When the lever is moved upward to disengage the points, the cam presses on a releasing arm engaging the rim of the log alongside of the upper point, so that the latter is easily withdrawn.

Fluorography.

Fluorography is a process of transferring lithographic or phototypic prints to glass by means of fluorated inks, which, in contact with sulphuric acid, disengages hydrofluoric acid, which eats into the glass. The phototype is inked with the following compound:

	Grammes.
Soap.....	50
Glycerine.....	200
Tallow.....	50
Water.....	100
Borax.....	25
Flourepar.....	50
Lamp black.....	15

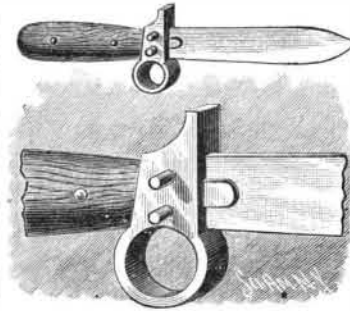
Negatives are taken and transferred to the glass. The latter is surrounded with a border of wax and covered with sulphuric acid of a density of 64° or 65° Baumé. After fifteen or twenty minutes the acid is poured off and the glass is washed with water and cleaned with a solution of potassa, then washed with water again and dried with a cloth. According to the *Revue de Chimie Industrielle et Agricole*, this is the process that gives the best results.

Height of Clouds.

Prof. Moller, of Carlsruhe, has made some interesting observations on clouds. The highest clouds, cirrus and cirro-stratus, rise on an average to a height of nearly 30,000 feet. The middle clouds keep at from about 10,000 to 23,000 feet in height; while the lower clouds reach to between 3,000 and 7,000 feet. The cumulus clouds float with their lower surface at a height of from 4,000 to 5,000 feet, while their summits rise to 16,000 feet. The tops of the Alps are often hidden by clouds of the third class, but the bottom of the clouds of the second class, and especially of the thunder clouds, often enfold them. The vertical dimensions of a cloud observed by Prof. Moller on the Netleberg were over 1,200 feet; he stepped out of it at a height of about 3,700 feet, and high above the mountain floated clouds of the middle class, while veils of mist lay in the ravines and clefts. The upper clouds were growing thicker, while the lower ones were dissolving, and soon it began to rain and snow.

A SIMPLE AND READILY APPLIED KNIFE GUARD.

The device shown in the cut is designed for use on knives, fishing rods, handles of hammers, and other tools, to facilitate obtaining a firm hold of the article to be grasped, and permit of suspending it from one of the fingers when desirous of using the hand for other purposes. It is a guard provided with a thumb rest and a ring, and is secured to a knife by transverse rivets



BAILEY'S KNIFE GUARD.

through the cutting blade. From the front of the guard two lugs extend forward and fit snugly on the sides of the blade, forming a shield, while the rivets are preferably extended on either side, so that when used on a carving knife the latter may be laid down without

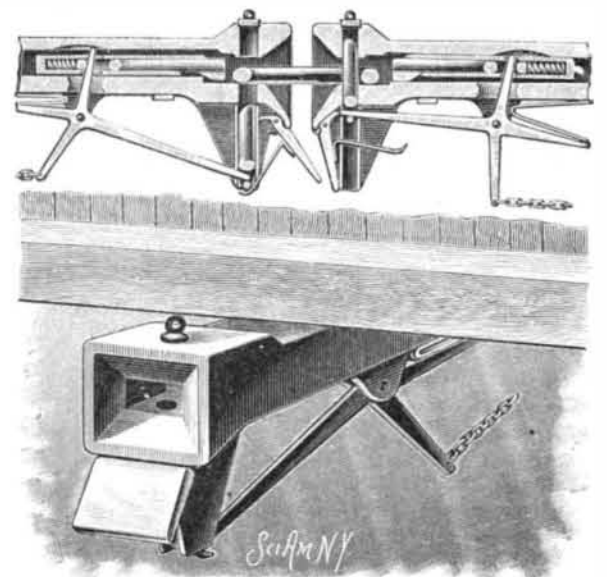
touching the table or table cloth. Instead of applying the guard as shown, it may be arranged with the thumb rest and ring on different sides relatively to the handle, as may be preferred on special kinds of knives, according to the work to be done.

For further information relative to this invention address Mr. William P. Bailey, the patentee, Stowe, Vermont.

AN IMPROVED CAR COUPLING.

The device shown in the accompanying illustration is designed to be operated from the sides or top of the car, to work in any climate without easily getting out of repair, and to be applicable to all styles of cars, coupling with cars of different heights that use a link in coupling. It has been patented by Mr. Aaron Lougheed, of Port Arthur, Ontario, Canada. The drawhead has a flaring mouth, near which is a vertical tubular pin aperture extending from top to bottom of the coupler, and through a projection on the bottom, in which moves the coupling pin, the aperture being closed at the top by a removable cover, to exclude snow and ice. A guide rod or apron is pivoted below the mouth of the drawhead, and is held by a spring to extend downwardly and outwardly when the car is uncoupled, this spring being held at one end in a pocket on the inner side of the rod, and extending through slots in the vertical projection on the under side of the drawhead. The spring thus extends across the aperture below the pin, which rests upon it, holding the rod in position, as seen to the left in the top view, so that if a lower car is to be coupled to a higher one, the link of the lower car will strike the guide rod and be directed thereby into the mouth of the coupling. The slots in the vertical projection extend to the bottom of the drawhead to receive the free end of the spring, and the end of the arm of a forked lever pivoted between ears farther back on the bottom of the drawhead. The pin is slightly tapering at its lower end and has a horizontal slot to receive the end of the arm of the lever.

Within the rear recess of the coupler is a loosely fit-



LOUGHEED'S CAR COUPLING.

ting sleeve, having a shoulder which fits a corresponding shoulder in the bottom of the recess, and holds the sleeve and a slide-rod within it in the forward part of the coupler. The slide-rod is movable longitudinally in the sleeve, and is held forward therein by a spiral spring, the latter being retained in the sleeve by another arm of the lever pivoted between ears on the under side of the drawhead, this arm projecting upward through a recess in the drawhead and through slots in the sleeve and slide-rod. The outer end of the slide-rod has a depending tongue, fitting a groove in the outer end of the sleeve, so that when the rod is pushed inwardly, the incline of the tongue raises the