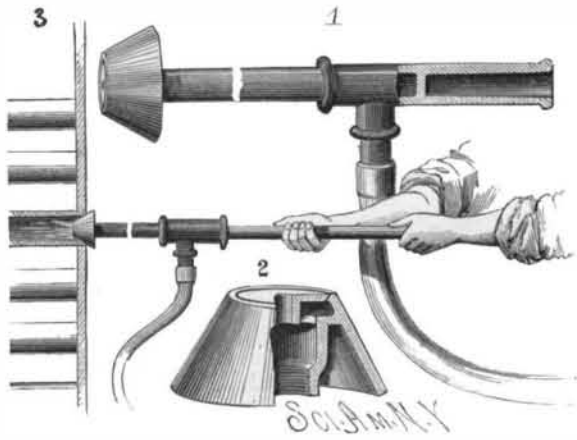


mitting of the finest work. The wheels are provided with adjustable seats, by means of which the pieces may be turned octagon or any other number of sides. The machine is so designed as to be easily and rapidly operated, and will finish smooth, with clean, sharp edges, from one hundred and fifty to six hundred pieces in ten hours.

This invention has been patented, and the machines are now manufactured by Messrs. D. C. & S. E. Smith, 227 West 5th Street, St. Paul, Minn.

BOILER FLUE CLEANER.

In the flue cleaner which we illustrate, the inventor has taken advantage of the cleansing power of a jet of dry steam, and has produced an instrument which is both effective and rapid in its operation. A truncated cone of cast iron, having the diameter of its base



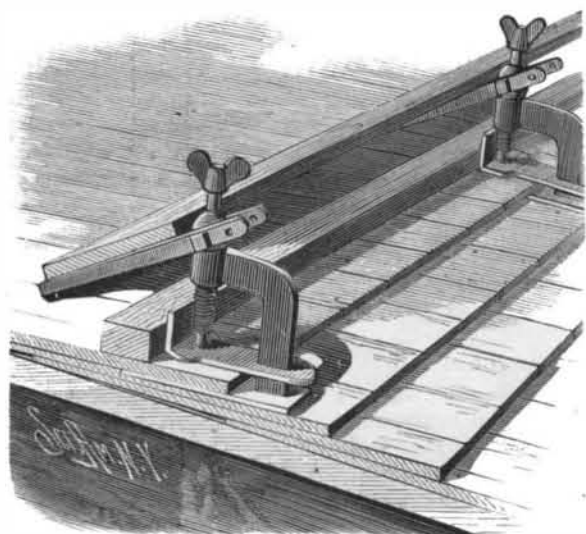
FERGUSON'S BOILER FLUE CLEANER.

somewhat greater than that of the flues to be cleaned, is screwed on the end of a section of tubing, which has a socket on its other end for the reception of a handle, and a right-angled neck for connection with a flexible steam pipe. This construction is shown in the first figure on a larger scale, and in the third figure as in actual operation. In the second figure, a portion of the truncated cone has been broken away, in order to disclose the internal arrangement. The neck of the conical nozzle is screw-threaded to make a tight joint with the tube section, and, by means of suitable braces, supports a disk at its face, provided with an annular opening and a central aperture for the discharge of the steam blast. The nozzle closes the mouth of the flue, excluding all air, and, by means of the openings in its disk, discharges a current of steam against the sides of the flue, sweeping out all obstructions and preventing the formation of scale. Where the cleaner is intended for use with an upright boiler, the handle may be arranged at right angles to the tube.

The device has been patented by Mr. J. M. Ferguson, 99 Camp Street, New Orleans, La., who will furnish further particulars.

CLAMP FOR ROOF SCAFFOLDS, ETC.

Attached to a plate which can be inserted under one of the shingles, as shown in the engraving, is an arm carrying a clamping screw having a bearing plate attached to its lower end. The bearing plate is slotted to receive the arm, and when borne down by the screw it serves to securely clamp the shingle between it and the lower plate. The upper end of the bearing plate is formed with a toe or upright, against which and



BARLOW'S CLAMP FOR ROOF SCAFFOLDS, ETC.

the corresponding toe of an adjacent clamp a "straight edge" may be placed when shingling the roof, to provide for laying the shingles perfectly true without the aid of a chalk line or any other guide. On each screw above the arm is a ball, to which is pivoted a support for the plank. This support consists of a bar slotted at one end where pivoted to the ball, and provided on the under side of its opposite end with any number of small pointed projections to stick

into the roof to assist in holding the clamp in place. The clamps may be quickly and easily shifted from time to time to adjust them to different positions on the roof as the work progresses. It is claimed that one man by the aid of this device can lay 5,000 shingles a day, and that its use will result in a great saving of time and money. It can be used in laying tin or slate roofs, and by painters or tanners, and by farmers or others in repairing roofs. It does away with lumber for scaffolding and the labor of nailing the same. The clamp can be used in all kinds of weather, and would prove useful in case of fire in ascending the roof.

This invention has been patented by Mr. A. T. Barlow, of Marshfield, Oregon; further information can be obtained from Messrs. Crawford & Lockhart, of same address.

Crushing Limit of Columns.

In preparing a plan for an electric lighthouse, M. Bourdais, the architect of the Palace of the Trocadero, investigated the height to which a column of different materials could be raised without crushing under its own weight. The weight of a pyramid with a square base may be expressed by the equation:

$$P = D^2 \frac{h}{3} \delta$$

in which D represents the side of the base of the pyramid, h the height, and δ the density.

The resistance is: $R = \frac{P}{D^2}$

Hence $R = \frac{1}{3} h \delta$

$$h = \frac{3 R}{\delta}$$

If we take for the limiting value of R one-sixth of the load, which produces crushing in iron, and one-twentieth for different varieties of stone, we may deduce the following table:

MATERIAL.	R.	δ.	H.
Porphyry.....	2,470,000	2,870	2,550 meters.
Iron.....	6,000,000	7,800	2,280 "
Granite.....	800,000	2,700	900 "

Such are the practical limits to which a pyramid might be raised in the respective materials. It is evident that the Egyptians, in the great pyramid of Cheops, stopped far below the limit. If the prismatic form were adopted, the height could be only one-third as great.—*Lumiere Electrique.*

Decay of Neglected Bridges.

The rapid decay experienced by iron bridges which are neglected has recently been exemplified in Callowhill Street Bridge in Philadelphia. When lately the painters were set to work on this structure, their preliminary exertions in cleaning off the rust brought off flakes of oxide from one-fourth inch to three-eighths inch in thickness. This at once revealed the extent to which the injury had already gone, and called attention to the necessity of an immediate survey. The fact that the weakening process had already proceeded to a dangerous extent was shown by the vibration, which was so violent that the men had to hold on when a heavy load passed over, to avoid being shaken from the swinging stages. On examination, it was found that not only had rust invaded the material of the girders, but that the whole bridge, which is built on a rising grade, had moved down hill so far as to tear out the top courses of the upper abutment, and to buckle the struts of the intermediate supports, while the movements of the roadway had cracked the asphalt and forced out the paving blocks between the tram rails. The bridge crosses a railway, and provides for the street traffic above it; it includes one span of 340 feet. The structure was only completed in 1875, and thus ten years of neglect have sufficed to bring it to the verge of destruction.

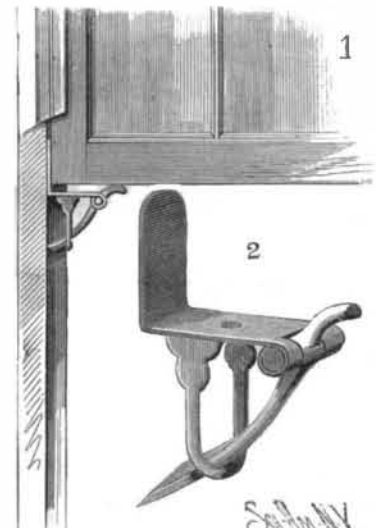
Brick Walls.

Except upon sites where stone can be quarried in the immediate neighborhood, we are all familiar with the economical advantages possessed by brick over stone as a material for walls. A two-brick wall is equivalent in strength to one in solid masonry 2 ft. in thickness, and here is a saving of 6 in. in space on every average external wall—no mean consideration on a town site where the ground is valuable. That bricks absorb more moisture than most kinds of stone is admitted, but they do not retain it for so long a period, and it is consequently less liable to find its way through brick walls. But apart from this, there are methods of protecting brick walls from damp, which we should shrink from applying to stone. If we were to affix ornamental hanging tiles to the surface of a stone wall, such concealment of a fine natural material would be regarded as a piece of vandalism in art almost equal to the application of cement. Hanging tiles form one

of the most picturesque of coverings for external walls, and greatly conduce to the appearance of home-like comfort which the exterior of a dwelling can be made to suggest; while, if glazed, they will not absorb moisture.—*Brick and Tile Gaz.*

PORTABLE SASH SECURER.

The form of this improved window sash fastener, which can also be used with advantage as a sash lock, is clearly shown in Fig. 2, while the manner of applying it to the window to hold the sash is shown in Fig. 1. In the outer end of a steel plate bent at right angles is pivoted a lever, one arm of which extends above the plate and is curved as shown; the other arm



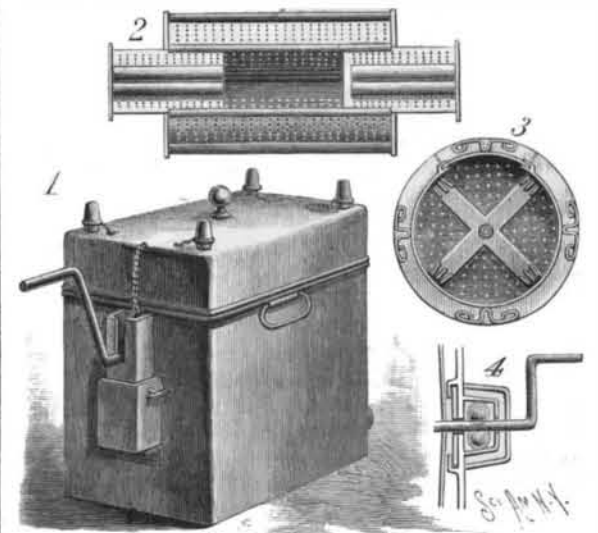
BETTERMANN'S PORTABLE SASH SECURER.

extends downward, and is made wider at its lower end and sharpened at the edge, so as to engage the guide rail of the sash when the device is placed in position for use. A U-shaped frame, riveted to the under side of the plate, prevents the long arm of the lever from dropping too far. To use the fastener, the sash is lifted and the upwardly bent portion of the plate inserted between the sash frame and the guide rail. The sash is then lowered so as to rest upon the short curved arm of the lever, when its weight throws the sharp lower edge of the lever against the rail, so as to bite into the same and thereby support the sash. To lower the sash, it is first lifted to permit the removal of the fastener. When used as a sash lock, the fastener is placed in an inverted position at one of the upper corners of the sash, when the latter cannot be opened from the outside.

This invention has been patented by Mr. R. Bettermann, of Cambria, Penn.

AN EASILY OPERATED WASHING MACHINE.

The illustrations herewith show a washing machine in which a perforated drum, holding the clothes, is placed in a boiler or reservoir containing soap and water, and the whole placed upon a stove and heated, when the clothes are washed by revolving the drum with a crank handle. Fig. 1 is a perspective view of the apparatus, Fig. 2 a plan representing the end covers partly drawn out, and Fig. 3 a transverse sectional elevation, Fig. 4 showing the working of the crank. The cover has an escape tube for the steam, with a cap to regulate its pressure, and there are ribs



ROGERS' IMPROVED WASHING MACHINE.

within the cylinder, which, as it revolves, raise the clothes and let them fall, and also cause the water to fall on them as the drum revolves; there are, besides, water elevators, formed by bent plates of galvanized metal, which take up the water and suds as the drum revolves, and cause it to pass through the perforations, so as to fall upon the clothes. This invention has been patented by Mr. Henry B. Rogers; particulars can be had from Messrs. Potter & Son, of Marshall, Mo.