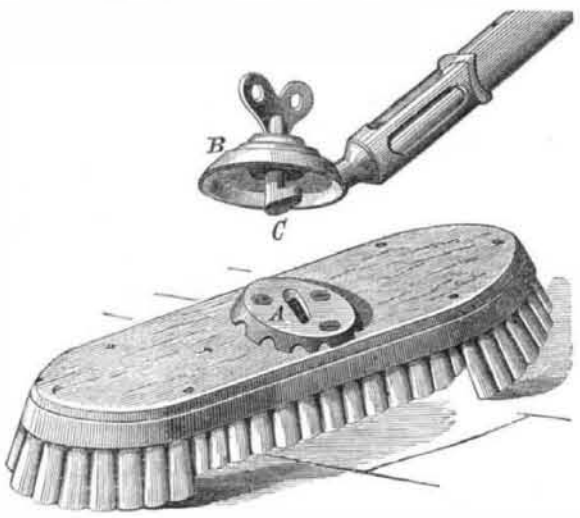
HOOD'S ADJUSTABLE BRUSH HANDLE.

Here is an invention which is just in time for spring house-cleaning, for which reason, together with that of its handiness, we have no doubt but that it will meet with general approval, especially from our lady readers, who are looking forward with no cheerful anticipations to that serious yearly



undertaking. It is a handle easily attached to any scrubbing brush, and so adjusted that it will enable the user to do her work standing up, and with much greater facility and ease than when kneeling on the floor.

A, in the engraving, is a conical plate secured by screws to the back of the brush. It has an aperture in the center, around which and on the under side of the plate an inclined plane is formed. A similar conical plate, B, is provided with a tapering socket to hold the handle, and fits over plate, A. The two plates are firmly clamped together by a key bolt, C, which, passing through plate, A, engages against the inclined underneath portion when turned. The upper flat surface of plate, A, and the under surface of plate, B, do not come in contact, the bearing being had between the outer inclined portions, and thus rendered firm and strong. Plate, A, is made higher on one side, thus causing the handle to assume an angle, more or less acute, with the back of the brush, according to the position in which it may be most convenient to use the latter.

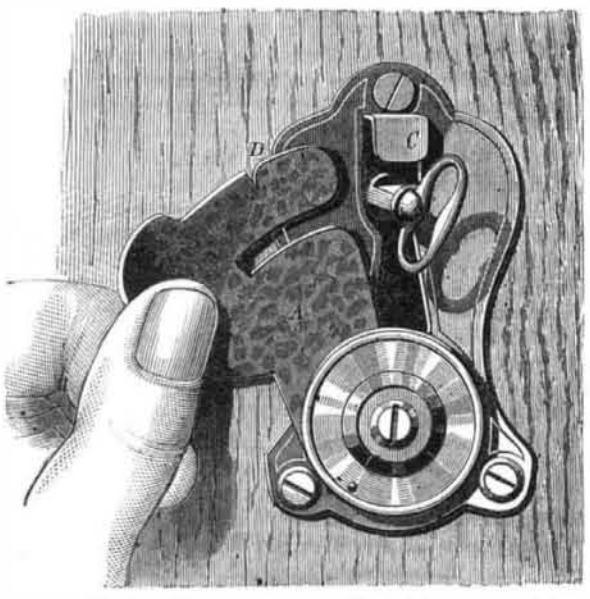
The brush may be placed nearly on a line with the handle, so as to facilitate working alongside the baseboard or near doors and windows.

Patented October 20, 1874. For further particulars regarding agencies for the introduction of the invention, address the patentees, Messrs. Hood and Joseph, Indianapolis, Ind.

ELDRIDGE'S SELF-ACTING KEY FASTENER.

The object of this invention is to provide a self-acting key fastener that will secure the key in a door lock on the inside of a room against turning, by burglars, with nippers and other instruments, from the outside.

The accompanying engraving represents a keyhole plate secured to the door, and to this, at the lower end, a movable arm, A, is pivoted. The arm is made concavo convex at the pivot end to contain a circular spring which operates it, one



end of the spring being secured to the plate and the other to the arm. A slot is formed on the upper end of the arm, to receive the shank of the key, which is filed square to fit the same; so that when the arm is closed by the spring, the key cannot be turned in the slot. The guide, C, and the shoulder on the arm form a stop, while the notch, D, passing under the guide, serves as a lock for the arm against outside pressure.

This little invention, we are informed, meets with much favor among Chicago architects. It has been patented by Mr. D. D. Eldridge, of 208 La Salle street, Chicago, Ill., from whom the manufacturing rights for the Eastern and Southern States may be obtained on reasonable terms.

Just So.

Snow's *Pathfinder and Railway Guide* (Boston) says, and we think truthfully, that, for a catalogue of all the most important inventions of the day, with scientific notes and explanations, the SCIENTIFIC AMERICAN has no competitor in this country; and it should have none, for it entirely fills the field of scientific information and research. Its pages contain information of interest to the most thoughtless reader; and it is difficult for the most unscientific mind to lay down a copy without scanning its excellent illustrations and explanations.

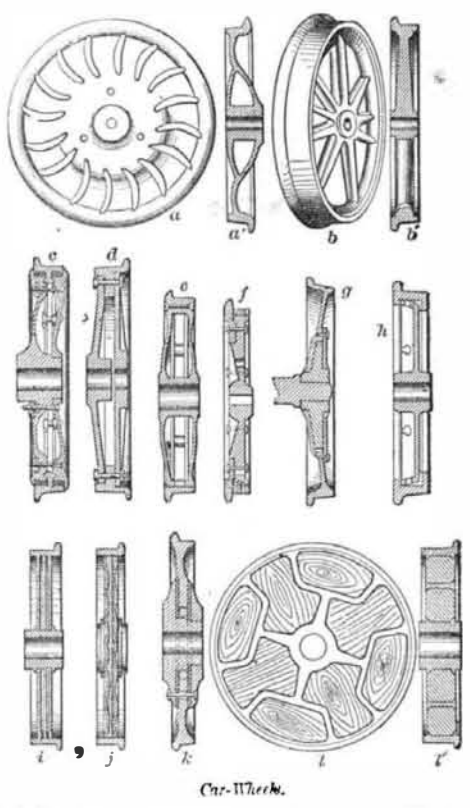
Dissolution of Hydrogen in Metals.

In previous researches on the metallic alloys formed by hydrogen, MM. L. Troost and P. Hautefeuille indicated the characters which distinguish these definite combinations from the solutions of hydrogen in metals. Potassium, sodium, and palladium combine with hydrogen, while a considerable number of other metals merely dissolve this gas. Iron, nickel, cobalt, and manganese offer striking analogies in the manner in which they behave with hydrogen at different temperatures. The facility with which they absorb or give off hydrogen gas depends greatly on their physical condition. An ingot of pure nickel gave out, in a vacuum, at a red heat, one sixth of its volume of hydrogen. Laminæ of nickel, obtained electrolytically, gave out forty times their volume. Pulverulent nickel gave up one hundred times its volume, and remained pyrophoric after the escape of the hydrogen. An ingot of cobalt gave up one tenth of its volume, electrolytic laminæ of cobalt thirty-five times their volume, and pyrophoric cobalt powder one hundred times. It also remained pyrophoric after the loss of the hydrogen. Soft iron in ingots gives off one sixth of its volume, and gray cast iron more than the half. Electrolytic laminæ of iron gave off 260 volumes. In fine, it may be said that iron, nickel, and cobalt absorb directly hydrogen gas, but it cannot be said that combination ensues, just as has been already shown in the case of lithium and thallium. Finely divided iron has a property which is not shared by nickel or cobalt: it decomposes water slowly at common temperatures, and rapidly at 100°. In this respect iron approximates to manganese.

CAR WHEELS.

It has been estimated by good authority that there are no fewer than 1,250,000 car wheels in daily use on the railroads of the United States. Each wheel travels 88·75 miles per

Fig. 1.

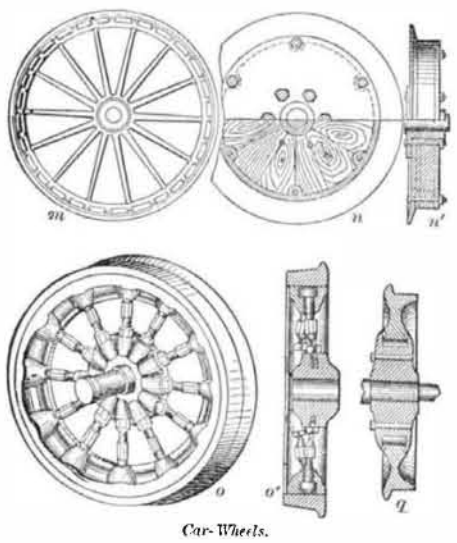


Car-Wheels.

day of 320 days per annum, and its average load is 3⅛ tuns. With this stress, the life of the wheel is about 45,000 miles, or 1·58 years On trains running at express speeds, the average life does not exceed 10 months' service, while wheels under tender trucks have a life of 18 months. A freight wheel, it is stated, often lasts over 3 years. Assuming the average life of car wheels under all kinds of service to be 5 years, the total number of wheels worn out annually in the United States may be placed at not less than 250,000. Allowing an average cost of $18 per wheel, and calculating about one half for the value of the old wheel, the annual loss may be stated at two and a quarter millions of dollars.

We present, in Figs. 1 and 2, a few examples of the numerous inventions of this class. *a a'* represent the well known Washburn wheel; *b b'* are perspective and sectional views of a spoked wheel of rather antiquated form; *c* is a Woodbury wheel, which has a compressed annular elastic packing between the cylindrical faces of the body and rim. The body is sectional, having two webs bolted together. Each portion has a flanged rim, the combination of the two forming an annular seat for the tyre. *d* is a wheel cast in three separate pieces, consisting of a rim and two portions, each of which latter has a hub and a web, between which the inner flange of the rim is gripped and bolted. The wheel, *e*, has side plates cast in one piece with the hub and cross pieces, which connect the peripheries of the side plates. The encircling tyre is secured by rivets. In the wheel, *f*, the tyre has pins upon its inner side, which enter slots in the rim of the wheel to hold the tyre from shifting. The flange piece has a shoulder projecting on the inside, that fits in a circular groove in the body of the wheel, to which it is bolted. The wheel, *g*, has a circular recess to receive a collar on the axle, over which is bolted a covering annular disk. This device is to allow the revolution of one of the wheels upon the axle on curves of the track. *h* is a car wheel constructed in two parts: first, a rim with two flanges forming an inner recess

Fig 2.



Car-Wheels.

and second, a hub with a web, and a flange upon the same, flaring slightly outward. Slots in this flange permit it to spring past the flange of the rim into the inner recess. *i* and *j* are two forms of wheel, in each of which the cast hub and rim are connected by corrugated wrought metal disks. *k* is the Raddin wheel, in which the entire web and rim are cast in one piece. The hub has binding rings which are bolted together through holes in the web, with interposed packing rings of india rubber to lessen tremor and jar. *l l'* are two views of the Watson wheel, in which the space between the hub and the rim is occupied by a skeleton metallic frame, having openings filled with compressed panels of wood.

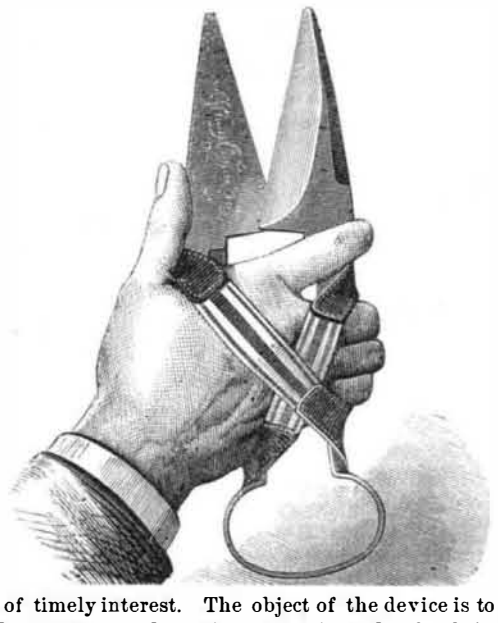
In the wheel, *m*, Fig. 2, the wedges of wood are driven between the rim and the tyre, in order to absorb the jarring motion. *n n'* are views of a compound wheel in which segments of wood form a web between the hub and the rim, and are secured by metal plates. *o o'* are views of a wheel in which the hub and rim are of cast iron united by wrought iron spokes, each alternate spoke leaning at an angle from the opposite side of the central circumference of the hub to the central line of the rim. *q* is a wheel somewhat similar to *k*, in which the web of the wheel is enclosed between binding plates, and has a packing between itself and the plates, and also on its inner edge.

Paper, when entering into the composition of car wheels, is tightly pressed in as a packing between the steel tyres and the cast iron hubs, so as to form a compact, strong, and yet somewhat resilient material, which deadens sound and diminishes the force of concussion.

The illustrations are selected from the pages of Mr. E. H. Knight's "Mechanical Dictionary." *

HAND SUPPORT FOR SHEEP SHEARS.

As the sheep-shearing season is now close at hand, a novel arrangement of a support for the hand while holding the shears, which we illustrate herewith, will doubtless



prove of timely interest. The object of the device is to enable the operator to have free use of his hand while the muscles of the same are firmly braced, and thus assisted during the fatiguing labor. He is thus enabled to exert greater strength, and may, at the same time, rest the hand without laying down the implement. The attachment consists of straps, of leather, rubber, or other suitable material, which are secured to one of the shears handles. Rings or loops are fastened to the other handle, and through these the straps are passed so as to form a cross over the back of the hand, the ends being secured and the length adjusted by suitable button holes and hooks. As illustrated in the engraving, elastic bands are employed, in which case the straps are riveted or otherwise permanently attached to the handles of the shears.

A caveat for the invention has been prepared by the Scientific American Patent Agency. Further information may be obtained by addressing the inventor, Mr. James L. Smith, P. O. box 290, Tuscola, Ill.

* Publishers, J. B. Ford & Co., New York city.