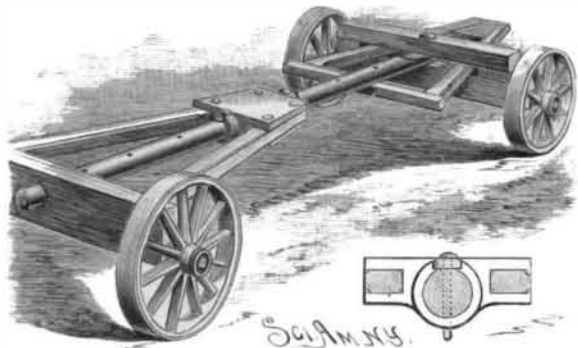


WAGON COUPLING.

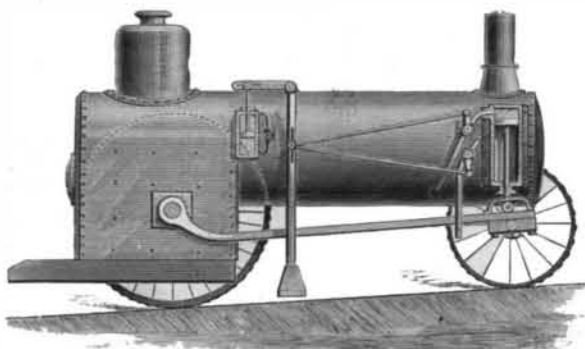
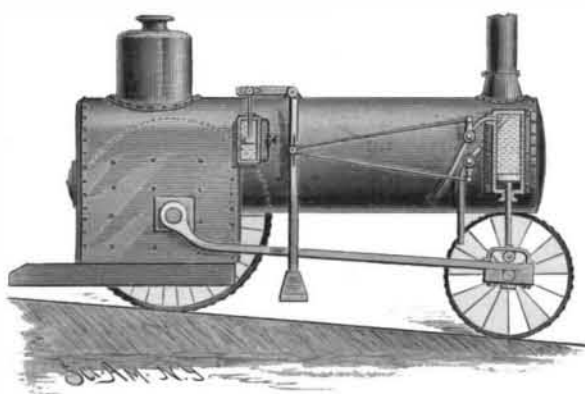
This coupling, for connecting the front and rear ends of a wagon, is the invention of Mr. B. L. Farquhar, of Grátis, O. To the forward ends of the bars of the rear hound is secured a casting formed with side recesses to receive the hound bars. The reach is of cylindrical form, and is received in the sleeve on the casting and extended through a round hole in the rear bolster. The forward flattened end of the reach is secured by the king bolt in the usual way. The reach is prevented from moving in either direction through the sleeve by two rings held by pins passing through holes in the reach. A series of holes in the reach permits of changing the position of the rings to lengthen or shorten the wagon. As the reach is

**FARQUHAR'S WAGON COUPLING.**

free to turn in the sleeve, it is evident that in passing over an uneven road, either the forward or rear axle may be inclined at any angle without straining the reach, or the rear hound, or the king bolt; and in case of the wagon turning over, this construction avoids breakage by allowing the reach to turn freely and independently of its attachment to the rear part of the wagon.

LEVELING APPARATUS FOR STEAM BOILERS.

This apparatus for automatically keeping steam boilers in a level position is designed particularly for use on road locomotives or traction engines. One end of the boiler is provided with one or two cylinders; the lower end of the piston rod carries a roller resting on a guide attached to the bolster of the truck of the boiler. The front end of the boiler is thereby supported on the fixed piston. The upper end of the cylinder, above the piston, is connected by a pipe with the water compartment of the boiler, while a pipe from the same end opens into the air or may lead to a pump connected with the boiler. Each of these pipes is provided with a valve, and these valves are operated by rods leading to a pendulum suspended from the top of the boiler. When the boiler is in a horizontal position, both valves are closed and the piston is in the middle of the cylinder. When the truck passes down an incline, as shown in the upper view, the pendulum assumes an inclined position to the center line of the boiler, and the upper valve is opened to admit water

**KRAMER'S LEVELING APPARATUS FOR STEAM BOILERS.**

under pressure from the boiler into the top of the cylinder, thereby forcing the front end of the boiler upward until the pendulum and boiler are again in a normal position, when the valve is closed.

When the truck again reaches a horizontal position, the pendulum swings and opens the lower valve, when the water is forced from the cylinder until the piston reaches its middle position. When the truck passes

up an incline, the water escapes from the cylinder and the forward end of the boiler is lowered, as shown in the lower view. A rigid arm extends from the upper end of the pendulum to a piston rod working in a cylinder filled with oil; the upper and lower ends of this cylinder are joined by a pipe provided with a valve. The speed of this piston, when changing its position, and consequently of the pendulum, is regulated by the flow of oil through the pipe. When the valve is closed the pendulum remains stationary. The use of this device, by keeping the boiler constantly level, will prevent the flues from burning.

This invention has been patented by Mr. John M. Kramer, of Maria Stein, Ohio.

Don't Undervalue the Boy.

The following sound reasoning we find in the *American Agriculturist*. It would be a benefit to both fathers and their sons if its precepts were more often regarded.

Too many men make their boys feel that they are of little or no account while they are boys. Lay a responsibility on a boy, and he will meet it in a manful spirit. On no account ignore their disposition to investigate. Help them to understand things. Encourage them to know what they are about. We are too apt to treat a boy's seeking after knowledge as mere idle curiosity. "Don't ask questions" is poor advice to boys. If you do not explain puzzling things to them, you oblige them to make many experiments before they find out; and though experimental knowledge is best in one sense, in another it is not, for that which can be explained clearly does not need experimenting with. If the principle involved is understood, there is no further trouble, and the boy can go ahead intelligently.

Do not wait for the boy to grow up before you begin to treat him as an equal. A proper amount of confidence, and words of encouragement and advice, and giving him to understand that you trust him in many ways, helps to make a man of him long before he is a man in either stature or years.

The *Boston Journal of Commerce* also makes a good suggestion to parents apropos to the above.

Give him tools, says the writer, and let him find out for himself whether he has got any mechanical taste or not. Do not discourage him, as parents are apt to do, by saying: "Oh, it is no use for you to try to do anything with tools. I never have any taste that way, and of course you have not." If a boy finds he can make a few articles with his hand, it tends to make him rely on himself. And the planning that is necessary for the execution of the work is a discipline and an education of great value to him. The future welfare and happiness of the boy depends on the surroundings of his youth. When he arrives at that period in his life when he is obliged to choose what profession or what line of business to follow, it is highly important that he should take no false step. And if in his youth he has cultivated a taste for any particular branch, the choice of a profession or business will be made more easy.

George Westinghouse.

George Westinghouse owes his great and rapidly increasing wealth to his inventive genius. Twenty years ago he was a poor young man, but he struck it rich in his air brake for railroads, and money has since flowed into his coffers in a golden stream. He is one of the most prolific inventors of the age, and has enough good mechanical ideas to furnish every manufacturing establishment in Pittsburg with successful specialties. He is not only highly skilled in theoretical and practical mechanics, but is also a thorough electrician. He expends an ordinary fortune every year in experiments necessary to the perfection of his inventions. By warrant of the King of Belgium he is entitled to the title of Sir George Westinghouse, having been knighted by that monarch as a recognition of his services to the world as an inventor. He is a native of New York State, and is about 40 years old.—*N. Y. Sun*.

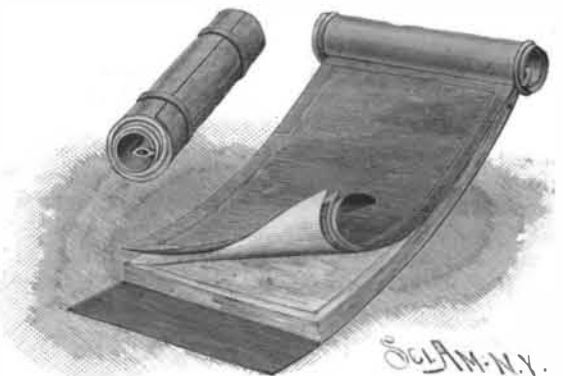
A Saw without Teeth.

A saw without teeth, that will cut a steel rail in two minutes, is in operation at the Central-Hudson shops, in Greenbush, N. Y. The saw is run by a ninety horse power engine, more power than is required to run all the other machinery in the shops, and is 38 inches in diameter, and three-eighths of an inch thick at the edge. The disk is made of Bessemer steel, and runs at a very high rate of speed. While in operation a band of fire encircles the saw, and the many sparks flying from the revolving disk resemble a display of pyrotechnics. To keep the saw cool and prevent it from cracking, a tank of water is placed above the machine, from which a small stream runs down and drops on the saw while in motion. By this plan one saw will cut nearly 3,000 rails before it is worn out. A steel rail, after about six years' constant use, becomes battered at the ends, and by cutting them off the rails can be used in branch and switch tracks. Rails are cut by this machine for the whole line of

the Central-Hudson Railroad. The saw, while cutting, bears down hard on the rail, the end of which is left as smooth as the bottom of a flatiron. One remarkable thing about the machine is that the chips cut from the rail fly back under the saw with such force as to form a solid piece of steel nearly as firm as the rail itself.

COPYING PRESS.

The engraving shows, both folded and opened, a simple, inexpensive, and portable press for copying letters. The back of the copying book is inserted in a slot extending the entire length of a cylinder made of

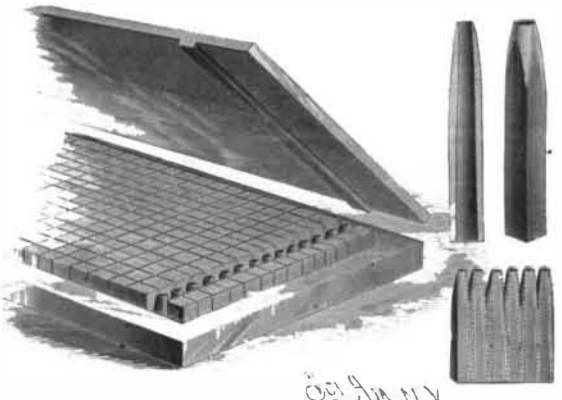
**HAINES' COPYING PRESS.**

sheet spring metal. The ends of the cylinder are hemmed and formed with creases for receiving elastic bands, which retain the back of the book in place in the slot. The book is formed of leaves folded around a triangular rod and stitched so as to inclose the wood, and is provided with a covering of suitable material, which covers the edges of the leaves when the book is wrapped around the cylinder. The leaves are made of tissue paper, and are prepared for receiving the copy by moistening them. The letter to be copied is placed in the book, a leaf is spread over it, and upon the back of the leaf is laid a moist cloth, when the book is closed and rolled tightly around the cylinder. Then two or three strong elastic bands are stretched over the book. The cylinder, by its elasticity, expands, thereby maintaining between the cylinder and bands a constant pressure upon the book. In two or three minutes the bands can be removed, the book unrolled, and the letter taken out.

This copying press is the invention of Mr. E. M. Haines, and is manufactured by the Haines Copying Press Co., of Dayton, O.

PERFORATING TYPE AND OVERLAY.

The object of this invention, which has been lately patented by Mr. Julius Mayerhoff, of Carthage, Mo., is to provide a device which, while much cheaper than others now in use, produces at the same time a perforation much sharper and neater than can otherwise be attained, and by the use of the overlay in conjunction with the perforating type to avoid cutting and injuring the rollers. The steel perforating type is equal in size to a nonpareil capital letter M, and is made in single type or in sets of any desired number, as shown in the right of the engraving. By making the faces of these types flush with the rest of the form, the inking roller will pass over them without obstruction or injury. By making the perforating type slightly shorter than the ordinary type, and making the overlay project correspondingly beyond the face of the tympan, the further advantage of avoiding both roller and ink is gained. As the type is formed with a tapering bore, increasing from the face toward the base, the little pieces of paper cut out pass down

**MAYERHOFF'S PERFORATING TYPE AND OVERLAY.**

freely, and no clogging is possible; when the type becomes filled, the form is raised and the accumulated pieces removed. A strip of soft lead, as shown in the large view, is attached to the tympan or cylinder of a press in such position as to meet the perforating type when the press is working, thereby obtaining a clean, sharp perforation, and both printing and perforating by one and the same operation.