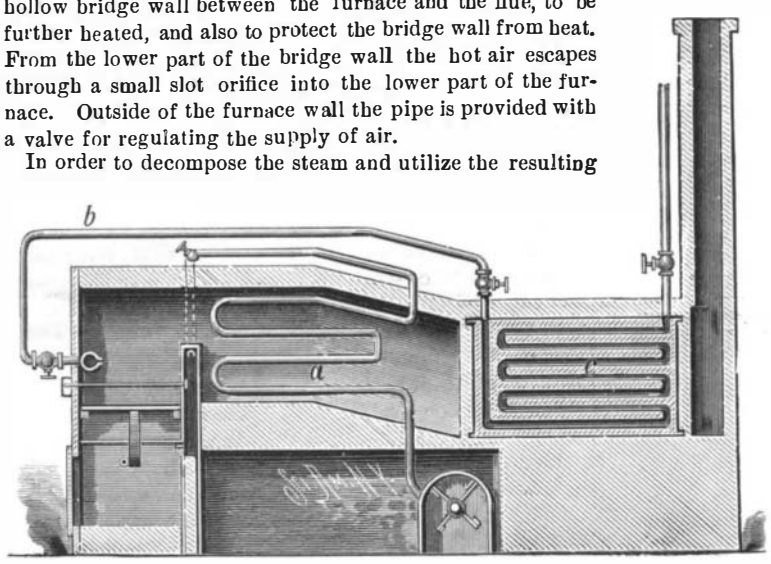
METALLURGIC FURNACE.

Our engraving shows a furnace recently patented by Mr. T. J. Wilson, of 87 Wall Street, Auburn, N. Y., which is designed for heating or reheating blanks. In the left of the cut is shown the furnace, in which coal may be burned on a grate, or a gas burner may be substituted. The hot blast apparatus consists of a fan and the coil of heating pipe, *a*, which is arranged in the flue to be heated by the heat of the furnace passing along it, and which has a discharge pipe passing outside of the wall of the flue and discharging into a hollow bridge wall between the furnace and the flue, to be further heated, and also to protect the bridge wall from heat. From the lower part of the bridge wall the hot air escapes through a small slot orifice into the lower part of the furnace. Outside of the furnace wall the pipe is provided with a valve for regulating the supply of air.

In order to decompose the steam and utilize the resulting



WILSON'S METALLURGIC FURNACE.

gases for fuel, there is arranged a superheating coil of fire clay (called by the inventor a "decomposer"), consisting of a series of horizontal communicating flues, *c*. This coil is placed next to the chimney and is in a fire clay lined metallic case, which has an exterior protecting jacket of similar material. The decomposer is arranged in the center of the flue, so that it will be acted on at both sides and ends by the heat passing along the flue.

The steam enters the decomposer by the pipe shown beside the chimney, and which is connected with the boiler and is furnished with a valve for regulating the supply. In the pipe, *b*, are two other valves, one where the superheated steam leaves the decomposer and the other near where the pipe enters the furnace chamber. By the first mentioned valve the steam may be retained in the decomposer until properly decomposed, and by the other the supply to the furnace may be governed. The steam is discharged into the furnace through numerous jet orifices of a pipe extending from side to side.

Here the oxygen of the steam, uniting with the carbon of the incandescent coal, forms carbonic oxide, leaving the hydrogen free to burn with great intensity in combination with the oxygen of the incoming hot blast. The carbonic oxide, at the same time taking up additional oxygen from the hot blast, burns with great intensity. These changes produce greater heat than the coal alone is capable of. The blanks to be heated are inserted through openings in the chamber above the fire bed. For discharging the ashes without wasting the whole of the fire bed, a temporary grate consisting of bars is shoved in through the front wall and the fire bed into recesses in the bridge wall, whereon the upper portion of the fire will be supported while the rest may be discharged through the lower grate.

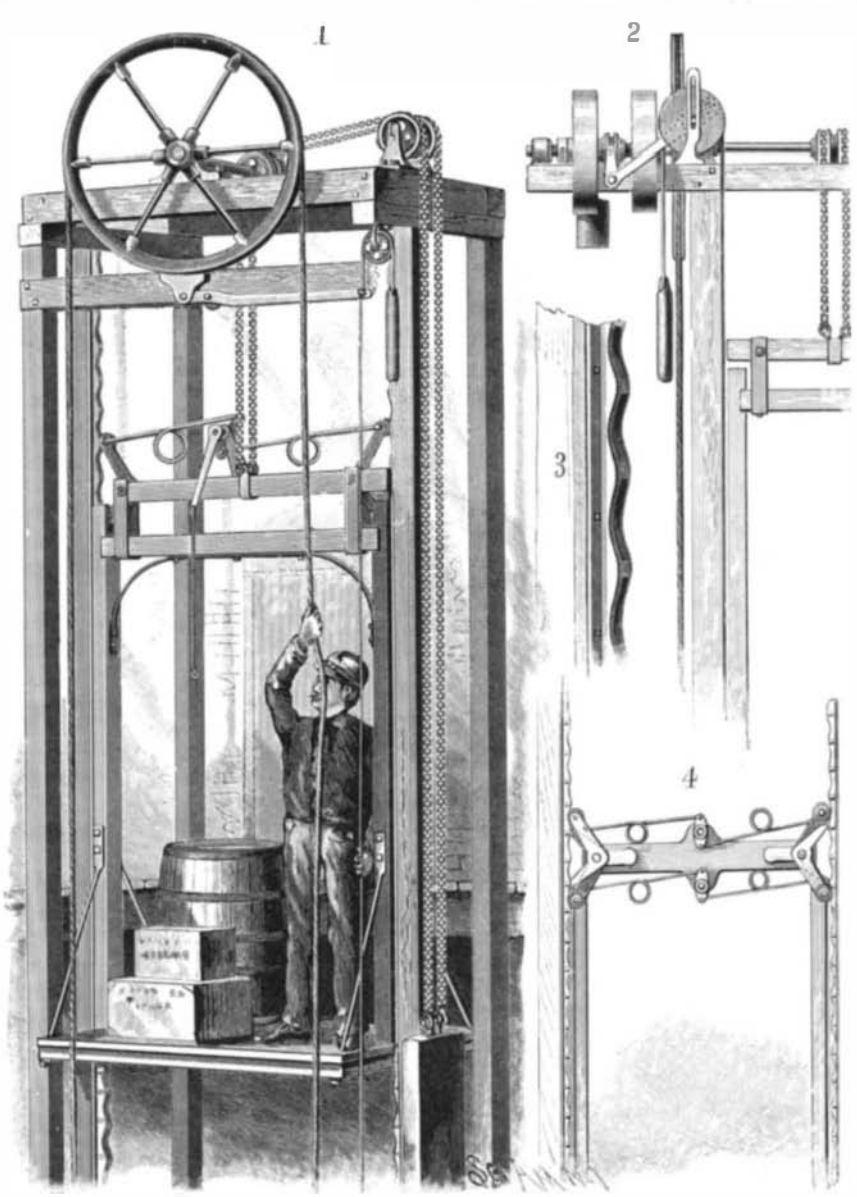
IMPROVED ELEVATOR.

Our engraving shows an elevator provided with safety appliances which are simple in construction, effective in operation, and which combine cheapness, strength, and durability. In Fig. 4 is shown a device for stopping the platform in the upward as well as the downward course, this being necessary, since some platforms are counterbalanced more than the weight of the empty platform, and are liable to damage by ascending rapidly in case they become accidentally disconnected from the motor. In Fig. 1 the device is arranged so as to only prevent the too rapid descent of the platform.

The racks for the ways in which the platform works are made with zigzag side flanges, and cross bars with which catch pawls engage when safety demands the stopping of the platform; the flanges confine the pawls laterally when thrust in the rack. The pawls are provided with arms that balance them away from the rack, and have rolls gravitating to contact with the zigzag ways, so that when the speed is not too fast the pawls will not engage the racks. But should the speed overrun the predetermined limit by the breaking of the chains, so that the thrusts of the projections of the ways would be greater on the rolls, or simply preventing the rolls from following in the bottom of the zigzags, then the pawls would come in contact with the cross bars, thereby holding the car. The roll arms of those pawls which stop the descent of the platform are merely made heavier than the pawls; but those in which the roll arms extend downward are provided with counterbalance weights. When the pawls catch on the racks the thrust tends to keep them in contact, so that in case they only catch slightly at first they will be forced into the bottom of the racks and securely engaged by the momentum of the platform. The pawls of the opposite sides are connected together by rods and balance levers, in order that both may engage the racks simultaneously. The rods are made elastic by means of coils in them, as rigidity might cause breakage in case one pawl should strike on top of a cross bar and the other in the notch between the bars.

The elevator platform (Fig. 1) is suspended from chains that pass over sprocket wheels mounted upon a cross shaft; the chains then pass over pulleys on top of the frame, and thence down to the counterbalance weight. Upon one end of the shaft is mounted a large grooved wheel, in which runs an endless rope which hangs down beside the car within easy reach of the operator. Pivoted to a cross bar near the under side of the wheel is a brake lever, the shoe of which presses against the periphery of the wheel. To the other end of the lever two ropes are attached; one of which passes over a grooved pulley and thence to a weight which acts to keep the shoe away from the wheel; the other passes down beside the platform, so that by pulling upon it the car may be stopped at any point.

Fig. 2 shows an arrangement in which power takes the place of the hand rope. A friction clutch placed between two pulleys mounted on the end of the shaft is operated by a rope passing down the well. This construction is shown plainly in the engraving. These devices have been patented by Mr. Volney W. Mason, and are now being manufactured by Volney W. Mason & Co., of Providence, R. I.

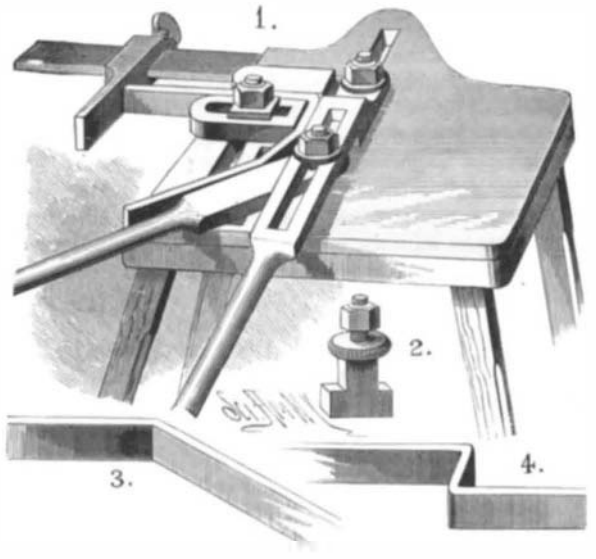


MASON'S IMPROVED ELEVATOR.

A YOUNG INVENTOR.— A California subscriber writes us of a 16-year old inventor, Master Edgar B. Badlam, who has patented an "improved steam boiler," and is perfecting other inventions which promise to be of importance. He has a model shop, costing $2,000, where he has turned out many models, his father thinking that "this is the kind of encouragement the young men of our day should have, keeping them off the streets and making self-supporting men and good citizens."

BENDING MACHINE.

An invention recently patented by Mr. W. W. Stokes, P. O. Box 160, Anna, Illinois, consists of a device for the use of blacksmiths, carriage makers, and other iron workers, for bending stirrup, clip, and other irons by hand. The bed plate is constructed with three parallel slots, and is provided with an anvil block and a gauge bar, both of which are firmly attached; the gauge bar has a shifting stop for gauging the distance of the bends from the ends of the



STOKES' BENDING MACHINE.

bars. Alongside of the anvil block is a former block, having one square end and one half-round end, secured with a bolt, nut, and washer, so as to bind it fast to the bed plate either parallel with, or obliquely to, the anvil block.

The washer is constructed with a rib as wide as the slot to prevent it from turning with the nut. Forms of different forms and sizes are employed according to the different forms and sizes of bars and the bends to be made in them. When the nut is removed, a keeper prevents the bolt from dropping out. In the outside slot is fitted a pivot bolt for the fulcrum of the main bending lever, the bolt being adjustable along the slot for locating the lever as desired relatively to the anvil, and having a sleeve on the part whereon the lever turns for the nut to jam on in securing the lever, and also for sustaining the wear. At a short distance from the pivot bolt the lever is recessed in the lower side to receive the forming block (Fig. 2), and a second lever between it and the bed plate, and it is formed with a longitudinal slot for inserting the bolts of the block and of the second lever. The forming block is to be set close to the end of the second lever when the latter is set at a distance from the recess shoulder and is used for bending a bar around the former. This former is more particularly employed when a reverse angle is to be made, as indicated in Fig. 4. When the bar is to be bent in the form of a clip (Fig. 1), or into an obtuse angle (Fig. 3), the former is not used.

When the machine is arranged as shown in Fig. 1, the first lever bends the bar around to the end of the former, and then the second lever bends it around to the side of the former for making clips.

Manganese in Animals and Plants.

Recent researches by M. Maumene have shown that the metal manganese exists in wheat, rice, and a great variety of vegetables. Wheat contains from one five-thousandth to one fifteen-thousandth of its weight of the metal, which exists chiefly as a salt of an organic acid. It is also found in potatoes, beetroot, carrots, beans, peas, asparagus, apples, grapes, and so on. The leaves of the young vine are very rich in it; so are the stones of apricots. The proportion in cacao is very great, as it is in coffee, tobacco, and especially tea. In the 50 grammes of ashes left by a kilogramme of tea, there was found 5 grains of metallic manganese. There are vegetables, however, in which no manganese can be found, as, for example, oranges, lemons, onions, etc. Many medicinal plants contain it, as, for example, cinchona, white mustard, and the lichen (*Rocella tinctoria*). Animal blood does not always contain it, but it is found in milk, bones, and even hair. M. Maumene regards its presence in the human body as an accident, and not of vital importance. He also suggests that doctors should cease to employ manganese as a succedaneum for iron, for while the latter is useful to the blood, the former is an intruder which is only tolerated in small traces, and rejected in larger quantities. Tea, coffee, and other vegetables require abundance of manganese in the soil for their proper cultivation, and the absence of it may account for the failure of many plantations.