

**AN IMPROVED SLIDE VALVE FOR ENGINES.**

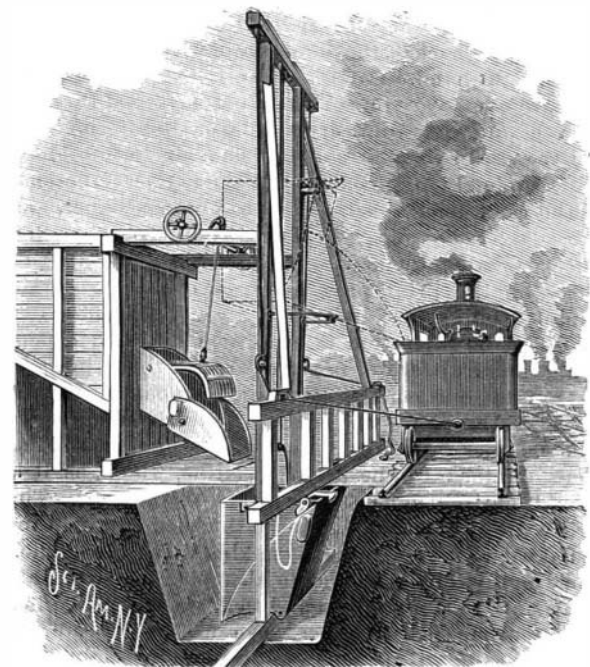
The illustration represents the application of a simply constructed slide valve for engines, provided with intersecting slots, and designed to be perfectly counterbalanced, so as to reduce the wear to a minimum. One of the small figures presents a sectional plan view thereof, the other showing the valve in perspective. It has been patented by Mr. Oscar L. Ward, of Eagle, Neb. From each end of the cylinder an inlet port connects with the steam chest, in which slides the valve, actuated by suitable means from the main driving shaft, the valve having a vertical slot connecting at all times with the steam inlet pipe. The valve also has a transverse slot intersecting the vertical one at right angles, and adapted to be connected alternately with the steam inlet ports leading to each end of the cylinder. The steam chest has exhaust ports near each end leading to the outside, and the ends of the cylinder are also connected with the exterior of the steam chest by pipes opening into the steam chest in line with ports connecting with the cylinder ends. In operation, live steam passing through the vertical slot of the valve exerts an equal pressure on its top and bottom, the steam passing through the transverse slot also exerting its pressure against the sides of the valve, so that it only rests by its own weight in the bottom of the steam chest, and the pressure against the valve is counterbalanced by the steam in the cylinder passing alternately through one of the pipes connecting the ends of the cylinder with the exterior of the steam chest, whereby the valve is at all times completely counterbalanced.

**Exhaustion of Natural Gas.**

Professor Orton, of Ohio, in a paper recently read before the American Association for the Advancement of Science, stated that there is not the faintest doubt that the natural gas supply in the Indiana and Ohio fields is not only exhaustible, but is rapidly and surely being exhausted. He said he was yet to find a man conversant with existing facts who does not entirely agree with him. The gas is stored in the rocks, where it has been for untold ages. It is not now being generated, and every foot that escapes to the surface leaves the quantity remaining for future use just so much smaller. The pressure of gas in the wells in the Ohio and Indiana fields is steadily diminishing, the decrease already having amounted to thirty or forty per cent. In view of this, Dr. Orton urges the imperative necessity for cities and States to take action restricting the lavish and wasteful use of gas. Even the strictest regulations cannot prevent the exhaustion of the supply of gas in a few years, but they may put off that exhaustion some time.

**A COAL ELEVATOR FOR RAILWAY SERVICE.**

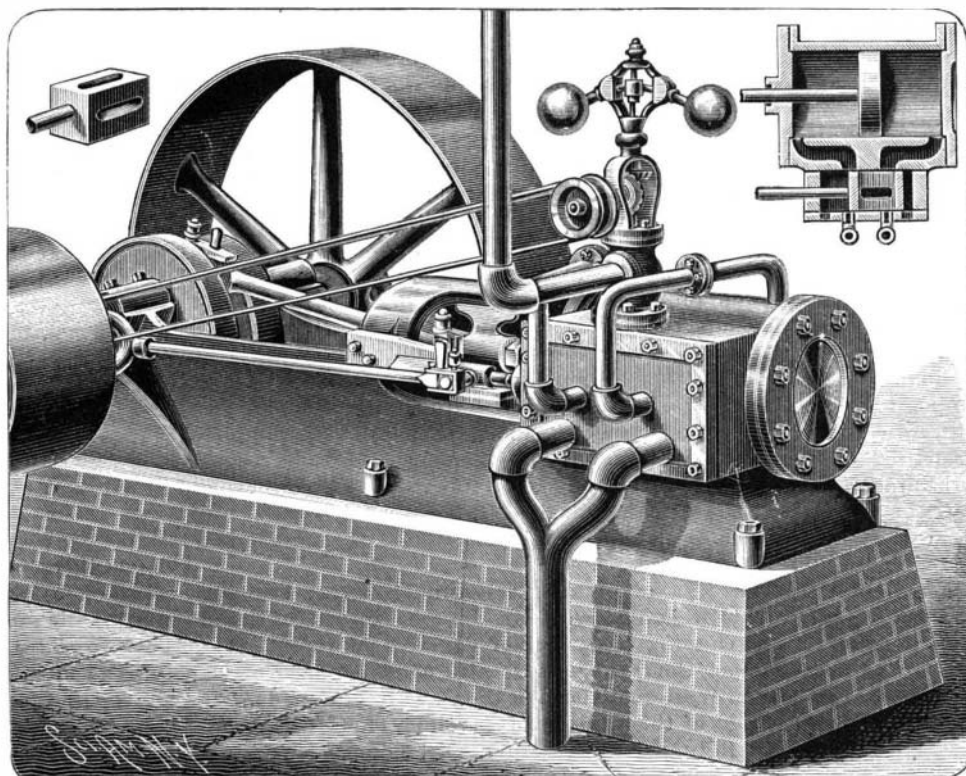
An elevator designed to load coal from a bin into the tender of an engine, the bucket being raised by the engine and dumped at the proper moment into the tender as the latter is brought in front of it, is shown in the accompanying illustration. A coal-holding bin with inclined bottom faces the track, and in front of it is a pit, upon the bottom of which is the base beam of a frame having two standards united at the top by a cross-bar. The frame is stayed by braces, and between



McLEAN'S COAL ELEVATOR FOR RAILWAY ENGINES.

it and the track is a guard fence. In the frame slides a bucket with forwardly inclined bottom, the front of the bucket consisting of a door pivoted at its lower corners, while side guards extend rearwardly in contact with the outer sides of the bucket. To the upper sides of the body of the bucket, at the front, are attached guide lugs, limiting the rearward movement of the door, the latter also having a weight attached to its upper end on each side, the weights being connected with the body of the bucket by ropes or chains of sufficient length to allow the door to drop to a proper incline, as shown in dotted lines. From the bail of the bucket two ropes or chains extend upward over guide pulleys in the top cross-bar of the frame, and downward and outward at the sides over pulleys journaled on the guard fence, the extremities of the ropes having each a hook or other fastening device whereby they may be readily attached to a locomotive.

In the front upper portion of the body of the bucket is journaled a shaft, centrally upon which an outwardly extending latch is pivoted, and the shaft has at one end a crank arm adapted for engagement with a trip on one of the standards of the frame, the trip being so located, and the length of the ropes or chains so calculated, that, when either rope or chain is attached to an engine, and the tender arrives opposite the frame, the crank arm of the bucket shaft contacts with the



WARD'S SLIDE VALVE FOR ENGINES.

trip to release the door of the bucket and deliver the coal to the tender, such position of the bucket being shown in dotted lines in the illustration. In the front of the bin is a downwardly inclined chute, to the lower extremity of which is pivoted an auxiliary chute, in such manner that it may be carried up to a vertical position, and within the main chute is pivoted a gate or cut-off, made preferably of a series of curved fingers united by suitable brace bars. This gate is raised to permit the coal to flow from the bin by a link connection with a cranked shaft journaled upon beams attaching the standards to the bin, the shaft being preferably manipulated by hand wheels at each end. By the lifting of the gate the auxiliary chute of the bin is thrown down for the delivery of coal into the bucket in the pit, the supply being cut off when the bucket is filled. With the drawing up of the bucket, the auxiliary chute is thrown upward to vertical position. When the tender has received its load, the engine is backed and the bucket thereby lowered, its open door, as it passes down, being closed by coming in contact with a yoke-like frame attached to the standards. The engine thus does the work of hoisting the coal, and the tender may be filled when approaching from either direction. This invention has been patented by Mr. A. H. McLean, No. 210 Mott Street, Saginaw, Mich.

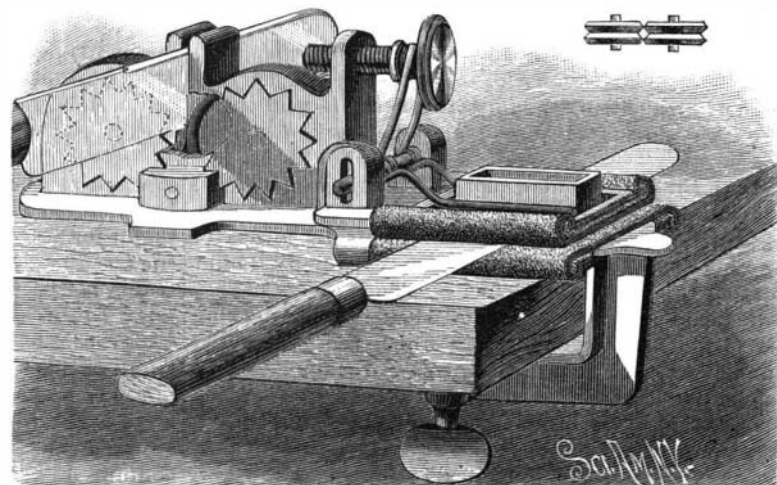
**AN IMPROVED KNIFE SHARPENER AND POLISHER.**

A simple and durable device designed to facilitate the quick and convenient sharpening and polishing of knives is shown in the illustration, and forms the subject of two patents which have been issued to Mr. John Vermeulen, of No. 300 East Seventy-fifth St., New York City. On one end of a suitably constructed bed plate adapted for attachment to a table or a bench is

arranged a casing with a vertical slot, into the lower part of which extend the rims of two sharpening rollers turning in suitable bearings in the casing. Each of the rollers has V-shaped annular ridges on its periphery, as shown in the small figure, the outer edges of the ridges touching at the center of the slot, so that when a knife is drawn through, as shown, its edge comes in contact with the edges of the ridges of the rollers and is thereby sharpened. The shafts of the rollers each have on one outer end teeth adapted to be engaged by a plate arranged in proper position for such purpose, the plate being on one end of a transverse shaft sliding in the casing. The shaft has a head on which bears a spring to normally press the head outward and hold the plate in contact with the other side of the casing in engagement with the toothed wheels, and, when the sharpening rollers have become worn at their contact point, the operator presses on the head of the shaft to force it inward and disengage the plate from the notched wheels. The sharpening rollers can then be turned a distance of one or more teeth, so that new portions of their ridges may pass into the slot. The shafts of these rollers may also be held in longitudinally sliding bearings, adjustable by a set screw, when, as the rollers become worn on their peripheries, the bearings may be moved nearer to each other. The sharpening rollers are preferably made of solid steel or emery, or they may be made of a series of washers. On the other end of the bed plate is a polishing device, with a lower fixed polishing strap and an upper yielding mounted strap. The ends of the lower strap are held in place by a spring plate pressing the ends of the strap against inclined lugs or flanges on the under side of the bed plate, the strap being easily removed for renewal when worn out. The upper strap is passed under a plate having inclined lugs at its sides, and the ends of this strap are held in place by another spring plate. At the inner end of the plate to which the upper strap is attached are upwardly extending vertically slotted lugs, through which pass the ends of a pin held in lugs on the bed plate, the vertical slots in the lugs permitting the upper plate to swing upward when a wedge-shaped knife is inserted between the two straps, the pin forming a fulcrum. A spring is arranged to press on the top of the upper plate to hold its strap against the strap of the lower plate or against a knife blade drawn between the plates to be polished. In the middle of the upper plate is a hopper, opening downward through

an aperture in the upper strap, whereby a polishing material placed in the hopper will be supplied to the polishing surfaces of the opposed straps.

THERE are 413 species of trees to be found within the limits of the United States and Territories, 16 of which, when perfectly seasoned, will sink in water. The heaviest of these is the black ironwood (*Condalia ferræ*), found only in Southern Florida, which is more than 30 per cent heavier than water. Of the other 15, the best known is the lignum vitæ (*Guaiacum sanctum*) and the mangrove (*Rhizophora mangle*). Texas and New Mexico, lands full of queer creeping, crawling, walking and inanimate things, are the homes of a species of oak (*Quercus grisea*) which is about 1¼ times heavier than water, and which, when green, will sink almost as quick as a bar of iron. It grows only in mountain regions, and has been found westward as far as Colorado desert, where it grows at an elevation of 10,000 feet. All the species heavier than water belong to tropical Florida or in the arid West or Southwest.—*Commercial Advertiser.*



VERMEULEN'S KNIFE SHARPENER AND POLISHER.