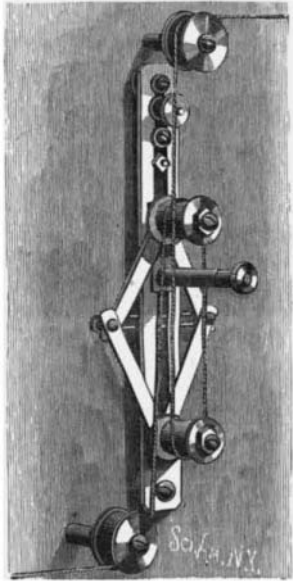


**A STEAM ENGINE INDICATOR STOP MOTION.**

To readily stop the motion of the paper drum of an indicator, to change the cards or for other purposes, without disconnecting the operating cord the improvement shown in the accompanying illustration has been patented by Henry J. Parchman, of Cedar Falls, Wis. A frame is secured to the engine or other support, near the cord connecting the pantograph with the indicator, and on the frame are studs carrying pulleys around which the cord passes, one of the studs being mounted on a slide moving in a slot in the frame, the slide being locked in adjusted position by stops, one of which has a handle to facilitate moving the stop in the slot. The cord, after leaving the pantograph, not shown, passes under a pulley and around the pulleys on the frame, and thence over another pulley to the indicator, so that the several pulleys are rotated on the forward and backward movement of the cord. On one of the studs on the frame are

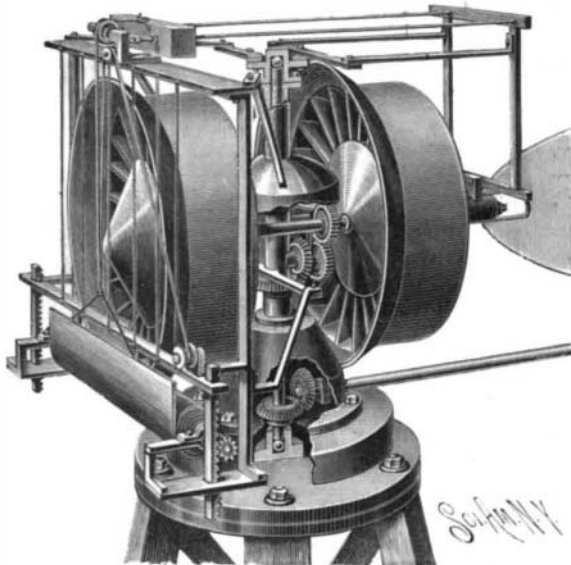


**PARCHMAN'S STEAM ENGINE INDICATOR STOP MOTION.**

fulcrumed levers pivotally connected with other levers fulcrumed on the other stud, a spring connecting the central pivots of the levers, and having a tendency to draw them together against the pull of the operating cord. While the cord is to positively connect the pantograph with the indicator, the slide is locked in place on the frame, but when the card is to be changed or the indicator stopped, a stop is loosened, permitting the slide carrying a stud and one of the pulleys to slide in the slot in the frame, the pull of the operating cord then drawing the levers toward each other in the opposite direction, against the tension of the spring. A yielding connection is thus introduced to compensate for the movement of the cord without affecting the indicator, the device working with indicators of any make, at any speed and in any position.

**AN IMPROVED WINDMILL.**

The windmill shown in the accompanying illustration is designed to utilize the force of the wind to the greatest advantage, and to automatically shut off the wind from the wheels should its velocity become too great. The improvement has been patented by Hubert Schon, of Allegheny, Pa. On a vertical shaft set on a ball bearing is a bevel gear connection with the driving shaft, and on the upper end of the vertical shaft is the ball bearing of a frame supported by the shaft, there being journaled in the frame a horizontal wheel shaft carrying front and rear wind wheels. Each wheel has an inner and an outer rim, between which are the wings or blades, and each inner rim is closed at its front end by a cone, while a hood is attached to the front of the outer rim, to gather the wind and direct it to the blades. The vertical shaft is connected by beveled gears with the horizontal shaft, and



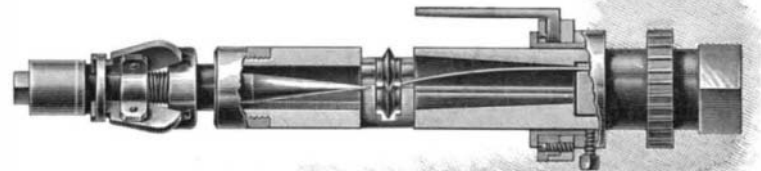
**SCHON'S WINDMILL.**

from the rear end of the latter extends a vane to hold the wheels to the wind. To regulate the speed of the wheels, a curtain or apron is mounted as a roll below the bottom of the hood of the front wheel, the pulling up of the apron cutting off the wind from the wheels. Attached to the upper edge of the apron is a rope which extends upward over a pulley and is connected with a governor that slides longitudinally on guide rods on a skeleton frame, the governor being in the

form of a box adapted to be driven rearward by the force of the wind, thus lifting the curtain or apron. Weighted racks acting on toothed trunnions on the curtain shaft counterbalance the governor and draw the curtain down when the wind decreases. To shut off the wind from the wheels at any time, a second rope is connected with the curtain, enabling the operator to raise it when desired.

**A TUBE OR PIPE CUTTER.**

For cutting boiler tubes or pipes, the device being firmly held in place while the work is being done, and the cutters having an automatic and positive feed, the improvement shown in the accompanying illustration has been patented by Patrick H. Benade, of Punxsutawney, Pa. The device comprises two aligned cylinders connected with each other at their ends by rods on which are journaled frames each carrying a cutter wheel. A cone with a longitudinal feather engages a keyway in one of the cylinders, the cone having a threaded shank engaged by an internally threaded sleeve which has on its outside a right and a left hand thread, on which screw nuts, levers carried on one of the nuts engaging inclined grooves on the other nut. When the tool is placed in a pipe, and a wrench is applied to the head, causing the cylinders to revolve, the nuts on the sleeve screw toward each other, causing the levers on one of the nuts to travel up the incline of the other nut, as shown at the left in the illustration, the free ends of the levers thus moving into firm contact with the inner surface of the pipe or tube. The continued turning of the cylinders then causes the shank of the cone to screw in the sleeve and feed the cone forward in engagement with the frames carrying the cutting wheels, which are carried around and fed outwardly as the turning continues. The turning of the tool in an opposite direction causes a withdrawal of the cutters and return movement of the cone, with a final release of the clamping levers from the inner surface of the pipe. On the outer cylinder is a gage with gage fingers adapted to set the cutters to the proper point at which the tube or pipe is to be cut off, the fingers resting against the end of the boiler, and being adapted to open and close, that they may be kept as close to the tube as possible loosely, the tool being adapted to cut several sizes.



**BENADE'S TUBE OR PIPE CUTTER.**

know all about heat units and calorimeters, but would have considerable difficulty, on starting the engine under their care, in finding the valve for draining the water out of the cylinders, even if the propriety of this operation should occur to them; while the men who have handled engines intelligently and successfully for twenty or thirty years are, as we are informed, in danger of being deprived of their livelihood because they cannot solve a mathematical problem involving the solution of a quadratic equation. How much foundation there may be for these complaints, we cannot say, but it would certainly be a mistake to undervalue experience in such examinations. Of course a man who has greased a locomotive successfully for twenty years might blow up a heating boiler at the first trial; but on the other hand, algebraic formulas cannot teach the light hand and quick eye of a good mechanic; so that such examinations should be arranged to test both the theoretical knowledge and the practical intelligence of the candidate, and great skill on the part of the examiner is necessary for this.—Amer. Architect.

**What All Boys Should Know.**

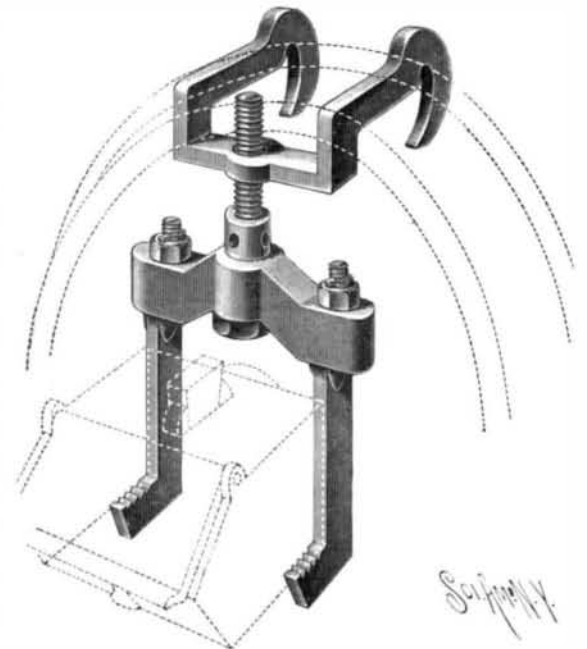
- Don't be satisfied with your boy's education or allow him to handle a Latin or Greek book until you are sure that he can—
- Write a good legible hand.
- Spell all the words he knows how to use.
- Speak and write good English.
- Write a good social letter.
- Add a column of figures rapidly.
- Make out an ordinary account.
- Deduct 16½ per cent from the face of it.
- Receipt it when paid.
- Write an ordinary receipt.
- Write an advertisement for the local paper.
- Write an ordinary promissory note.
- Reckon the interest or discount on it for days, months, or years.
- Draw an ordinary bank check.
- Take it to the proper place in a bank to get the cash.
- Make neat and correct entries in day-book and ledger.
- Tell the number of yards of carpet required for your parlor.
- Measure a pile of lumber in your shed.
- Tell the number of bushels of wheat in your largest bin, and the value at current rates.
- Tell something about the great authors and statesmen of the present day.
- If he can do all this, and more, it is likely he has sufficient education to make his own way in the world. If you have more time and money to spend upon him, all well and good—give him higher English, give him literature, give him mathematics, give him science, and if he is very anxious about it give him Latin and Greek, or whatever the course he intends pursuing in life demands.—School Supplement.

**Engineers' Licenses.**

Under a new law, all engineers in charge of power or heating plants in Massachusetts must be licensed, and in order to be licensed, they must pass an examination, arranged by the State authorities. Although enacted last winter, the law only went into operation in August, and the examinations are now open to candidates, who, if the daily papers are to be believed, do not take much satisfaction in them. It will be remembered that the supervising architect of the Treasury Department once wanted some assistants, who, either under the civil service laws or some special provision, were to be selected by competitive examination. The

**AN IMPROVED RAILWAY CAR JACK.**

A device especially designed to facilitate removing and replacing worn-out brasses in the journal boxes of



**KELLER'S RAILWAY CAR JACK.**

car axles, or for raising the box without disturbing the position of the wheel on the track, is shown herewith, and has been patented by Daniel A. Keller, of Rincon, New Mexico. The jack is shown in perspective in full lines in the illustration, its position on the car wheel relative to the journal box, when in use, being indicated by dotted lines. Transverse hooks, adapted to engage the top of a car wheel, are formed integral with a threaded cross bar, in which screws a screw rod, on which is hung a cross bar with depending angular arms, adapted to engage the under side of a journal box. The device affords a square lift, preventing cramping of the journal brass at any point. The power is applied at a point about fourteen inches above where it is applied on the ordinary pony jack, and the device can be set and used at ordinary passenger platforms. The inventor claims to be able, with this jack, to raise a journal box in one-fourth the time taken with the usual appliances, doing the work with less labor.