

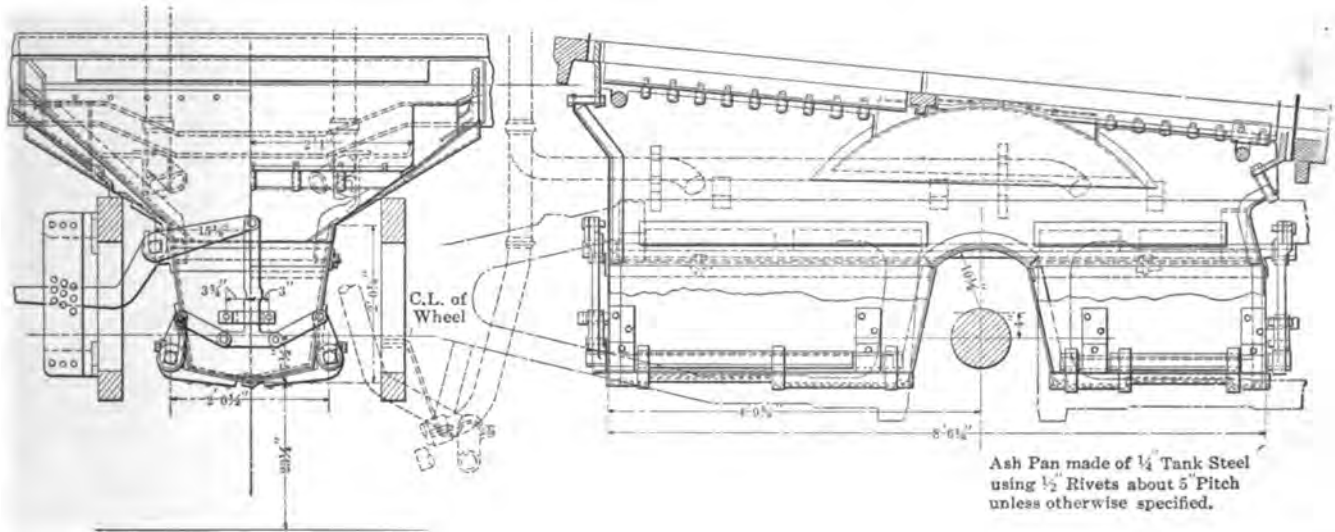
cutting tool by making it of proper shape. The time in finishing a valve stem with this tool is cut in half, and the finish on the stem is entirely satisfactory.

The rollers are  $1\frac{1}{4}$  in. diameter,  $\frac{1}{2}$  in. face and revolve on  $\frac{1}{2}$  in. axles; hinge pins, set screw "B" and stud "A" are  $\frac{1}{2}$  in. diameter and set screw "C"  $\frac{1}{4}$  in. The tool shank is  $1 \times 1\frac{1}{8}$  in. and the cutting tool is  $\frac{1}{2}$  in. square high speed steel; other details proportionate.

### SELF-CLEARING ASH PAN.

#### PENNSYLVANIA RAILROAD.

In order to comply with the requirements of the Federal law in regard to locomotive ash pans, the Pennsylvania Railroad Company considered quite a number of different designs. After experimenting with several of the most feasible, the design shown in the accompanying illustration was adopted for use on the Pennsylvania System and previous to January 1, 1910, when the law became effective, all of the locomotives owned or operated by the Pennsylvania Railroad Company were equipped



SELF-CLEARING ASH PAN USED ON THE PENNSYLVANIA RAILROAD.

with ash pans meeting the requirements of the law, a large majority of them being fitted with this style of pan.

As far as the pan proper is concerned there is nothing particularly novel about it. It has a large capacity and is very substantially built, flanged pieces replacing straight sheets and angle irons to a large extent. A liberal air opening is provided around the top.

It is in the arrangement of the doors that the principal point of interest lies. The whole bottom of the pan is formed by double doors hinged at the sides and overlapping each other in the center, so that any slight variation or warping will not leave an opening between them when they close. Near the bottom of the pan itself, on each side, are supported in suitable brackets long shafts which are square except where they pass through the supporting brackets. To the door plates are riveted heavy hinged pieces that have square holes through which the shafts pass. On the ends of the square shafts are arms which connect through links to the extensions of inverted T pieces, as is shown in the illustration. On the vertical arm an off-set is made, which, when it comes in contact with the guide, affects the relative position of the two doors, so that there will be no interference between them when being closed or opened.

On one side of the pan and above the hinged shafts is a bearing shaft from which extended arms engage the upper end of the T piece just mentioned. A suitable lever and lock for this shaft completes the operating details.

Some of the advantages which service operation of this pan

has shown are as follows: The use of a toggle for closing the doors insures a tight fit without any straining or bending of the operating levers. In case either door is stuck the entire force is applied automatically to this door. There is no danger of the doors fouling each other during the process of closing and opening and it is also found that no special instructions are needed covering the method of operating the pan.

After nearly two years operation this type of pan has been found to be entirely satisfactory and is being applied to new locomotives now on order. The operating rigging is patented.

### TRAIN RESISTANCE FORMULA.

In a communication to the *Engineer* (London), Lawford H. Fry, in discussing the paper on "Train Resistance," recently presented by Prof. Schmidt before the Master Mechanics' Association,\* presents the following formula:

$$r = 1.5 + \frac{106 + 2V}{W + 1} + .001V^2$$

$r$  = resistance of car in lbs. per ton (2,000 lbs.).

$W$  = weight of car in tons (2,000 lbs.).

$V$  = train speed in miles per hour.

which he has derived from Professor Schmidt's data, and states

that it expresses the results of the experiments with the same degree of accuracy as the formula given by Professor Schmidt and has the advantage of expressing the effect of both weight and speed in the same formula.

### A FEW DON'TS FOR ADVERTISERS.

Don't tell all in your advertisements—leave something for the catalogue.

Don't use small type; make reading easy.

Don't be too technical in expression; use terms easily comprehended by the average reader.

Don't make invidious comparisons.

Don't use cuts of unsuitable shapes and sizes because you happen to have them, thereby sacrificing balance and fitness of the advertisement.

Don't expect the compositor to arrange your copy forcibly; you must specify type line by line and furnish skeleton layout.

Don't permit advertisements to run without your final approval.

Don't sacrifice dignity to misapply humor in copy.

Don't crowd type matter; be generous in allowance of white space.—J. C. McQuiston, manager of the Westinghouse Bureau of Publicity in the *Trade Journal Advertiser*.

\* See AMERICAN ENGINEER, July, 1910, page 292.