

**AMERICAN SOCIETY OF CIVIL ENGINEERS.**—A paper by Edmund B. Weston, M. Am. Soc. C.E. was read giving the description and result of experiments on the flow of water through a 2½ inch hose and through nozzles of various forms and sizes; also giving the results of experiments as to the height of jets of water. The experiments were made at Providence, R. I. The water was taken from a hydrant to the head of which was attached couplings holding two pressure gauges and from the couplings the hose extended to a tank holding 2100 gallons, so arranged as to measure accurately the time and amount of delivery of water by the hose. Different length of hose were used. The experiments resulted in the following formula for flow from couplings.

1. For hose between 90 and 100 feet in length and where great accuracy is required.

$$V = Y \frac{2gh}{1.0256 d^4 + \left\{ .0087 + \frac{.0504}{V v} \right\} .12288 d^4 l}$$

For full lengths of hose a reliable general formula

$$y = V \frac{h}{.0155463 - .000398 d^4 + .0000362962 d^4 l}$$

giving velocity of efflux in feet per second  $h$ , head in feet located by gauge.

$d$  diameter of coupling in inches.

$l$ , length of hose in feet from gauge.

$v$ , velocity in 2½ inch hose.

Forty-five experiments were made on ring nozzles resulting in the following formula:

$$f = .001135 v^2$$

$f$ , being loss of head in feet owing to resistance of nozzle, and

$v$ , the velocity of the contracted vein in feet per second.

Thirty-five experiments were made with smooth nozzles resulting in the following formula:

$$f = .0009639 v^2$$

$f$  being the loss of head in feet owing to resistance and  $v$ , the velocity of efflux in feet per second.

Experiments show that a prevailing opinion is incorrect that jets will rise higher from ring nozzles than from smooth nozzles.

Box's formula for height of jets of water compares very favorably with experimental results.

### A HIGH TOWER PROJECTED AT PARIS.

The Washington monument may not long enjoy its pre-eminence as the highest structure in the world. An iron tower of the height of 1,000 feet is to be erected in the grounds of the French Exhibition in 1889. An elevator, the safety of which is guaranteed, will communicate with the summit, and visitors to the exhibition will be taken to the top for a small fee. Those who have the courage to make the ascent will enjoy an almost uninterrupted view for nearly 100 miles all around. The tower will also be utilized for astronomical and meteorological observations, for experiments in optic signalling, for the investigation of certain problems in experimental physics, and for various other scientific purposes. It will, perhaps, be remembered that a tower of the same elevation was spoken of in connection with the Centennial Exhibition at Philadelphia, but the necessary financial backing could not be had for the enterprise and the project was dropped.—*Ex.*

### IMPROVED PUNCHES.

We present engravings of two improved punches, made by Hilles & Jones, Wilmington, Del.

The horizontal flange punch for boiler makers or bridge builder's use, possess advantages that will be readily seen. The gearing and driving mechanism being all below the punch, leaves the top of the machine free for handling work of any shape, so that flanges of all forms, or bent angle iron, may be punched from the outside or inside, as may be desired.

A counterweight is provided, which draws the punch back when the clutch is thrown out.

The single vertical punch is designed for heavy work. The large spur wheel runs close to the bearing, the clutch being outside. This reduces the effect of "overhang" on the bearing to a minimum.

When desired, this machine can be furnished to serve as a shear as well as a punch, by the substitution of knife block.

Both these machines are massive, with metal well distributed, and are capable of doing heavy work without risk of breakage. They are made with any depth of jaw or throat required, up to 48 inches.—*Ex.*

### THE SELECTION OF APPRENTICES.

Messrs. Denny & Brothers, of the Leven Shipyard, Dumbarton, are abandoning the practice of taking premium apprentices, and in place of these they are recruiting the lower branches of their staff by means of competitive examinations, the vacancies being awarded to the most successful candidates. Two apprentices are wanted just now, and the terms on which they are to be accepted are as follow: The applicants must not be under fourteen years of age, must belong to the town of Dumbarton, or be at present apprentices in Leven Shipyard, and must be able to show good certificates of health and character. The subjects of examination will embrace: (1), Mathematics, including arithmetic, geometry, as far as the first two books of Euclid; algebra, as far as and including simple equations and logarithms; (2), theoretical mechanics, as required for the elementary stage of the Science and Art Department; (3), practical plane and solid geometry, also as required in the elementary stage of the department's examinations; (4), free-hand drawing; (5), mechanical drawing. For the first subject a maximum of 200 marks will be given, and for each of the other four subjects a maximum of 100 marks, making in all 600 marks a maximum for the five subjects. No candidate will be admitted who does not obtain 40 per cent. of the maximum number of marks. Successful candidates, in the event of their conduct and diligence being satisfactory, will be retained in the drawing office for an apprenticeship of five years, the rate of payment for which will be, respectively, £20, £30, £40, £50 and £60 per annum. In the interest alike of scientific shipbuilding and of Messrs. Denny & Brothers, we cannot but wish well to this new method of recruiting the profession from the most intelligent of the candidates who present themselves, but we scarcely understand why the selection should be limited to youths at present residing in the immediate neighbourhood of the works.—*Eng.*

### JOHN FINK WANTED IN CANADA.

The following extract is from a recent issue of the *Montreal Gazette*:

"A *capias* was issued on Saturday at the instance of Mr. John Turnbull, managing director of the Cornwall Manufacturing Company, for the arrest of Mr. John Fink, doing business in Baltimore, Md., under the style of Henry Fink & Son, for the alleged fraudulent sale of the right to use Fink's patent oil mixture. The *capias* was at once placed in the hands of a bailiff, with instructions to look out for him. Mr. Turnbull states that in 1879 the Cornwall Manufacturing Company purchased the receipt for the manufacture of this patent oil mixture, which was guaranteed to effect a saving in the oil used in the establishment of 40 per cent. The purchase of this receipt gave the company the sole right to manufacture this mixture in Canada. A few days ago Mr. John Fink came to this city, and going to Mr. Turnbull's office in this city, sold the sole right to use the patent in Canada over again for \$100, together with the saving which it would effect during the first three months of its use. On sending the receipt to the company at Cornwall, however, it was returned to him, with the information that they had already purchased it in 1879, and had discarded it as useless some time ago. Hence the issuing of the *capias*."

A person answering the description of John Fink was in New York City the day after Christmas, trying to sell the Fink mixture recipe to a gentleman in the slate trade. He gave his name as O'Donovan, and was in a hurry to catch a train to Chicago. He exhibited a certificate of a recent sale to the proprietor of a slate quarry in the vicinity of Bangor, Me.

The *Baltimore American* of December 30 publishes the facts noted in above extract from the *Montreal Gazette*, and says:

"The Fink family reside in an elegant residence in Baltimore County, built by the late Henry Fink about ten months ago. The business is carried on by the family, and all the transactions and correspondence is conducted from their home which is also the office. Mr. Fink acquired a considerable fortune by the sale of his patent."—*Ex.*

"Bob, what's steam!" "Boiling water." "That's right; compare it." "Positive boil, comparative boiler, superlative burst."