a metal plate in the back of the aluminium slate, and to this brass plate the pin is soldered. This method requires considerable time and adds to the cost. Mr. Nehr's object is to provide a simpler means for securing the pins.

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Notes and Queries.

HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters or no attention will be paid thereto. This is for our information and not for publication.
References to former articles or answers should give date of paper and page or number of question.
Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all either by letter or in this department, each must take his turn.
Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same.
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Scientific American Supplements referred to may be had at the office. Price 10 cents each.
Books referred to promptly supplied on receipt of price.
Minerals sent for examination should be distinctly marked or labeled.

(9206) J. A. McD. says: Could you inform me in regard to the welding of copper; is it still considered a lost art, or is it readily done over the country? Are there people looking for the secret? Would you say we can weld copper successfully? A. The welding of copper is not considered, so far as we are aware, a lost art. A number of companies are now welding copper without any serious difficulties, we believe; and the trouble which there has been in the past has been caused largely by the difficulty of getting sufficiently pure copper in the market. We know of no one who is looking for the solution of this problem.

(9207) C. W. says: Would you kindly inform me of the best method to pump sea water from a sandy beach, when at present considerable difficulty is experienced by the sand choking the pipe and steam pump, although the suction and X pipe is run out 200 feet from shore? Is there any way of keeping the sand out of a well if sunk on the beach? I suggested digging a well and sinking a barrel with the suction pipe cemented through the bottom and buried in the sand, but they tell me that the barrel would soon fill up from underneath; would that be so? Any information on the subject will be thankfully received, also as to what pump is considered the best for salt water. A. In reply to your inquiry regarding the best method of pumping water from a sandy beach, we would advise you to have your pipe run out as far as the conditions will allow and then have the pipe as large as you conveniently can, preferably with a flaring or funnel-shaped opening, so that the velocity of the water as it enters the pipe will be very small. Extending your suction pipe another 50 feet into the ocean would not appreciably increase the work on the pump. The additional work would be caused only by the slight amount of additional friction. For pumping salt water, it is best to have a pump with a bronze-lined cylinder, a bronze piston and piston rod, and bronze valves. Almost any of the well-known pump manufacturers will be able to furnish you with such.

(9208) N. P. says: 1. Give a formula to find how many horse power I need to run this machine: Driving shaft, 130 revolutions, 20-inch pulley; machine, 66-inch pulley, 9-inch belt, 40 revolutions. 2. Name of a small book containing similar formulas. 3. They write me from Italy about a much-advertised American invention—a Muller's "acousticon" for deaf and dumb. Muller is from Alabama, and his "acousticon" was experimented with in the New York Institute for Deaf Mutes with extraordinary success. Is anything true? If so, please give me some information. A. A common formula for calculating the horse power of a belt is "a single belt will transmit one horse power for each inch of width and for each 1,000 feet velocity per minute." A double belt will transmit 1 8-10 times as much power as a single belt. According to this formula, a 9-inch single belt, traveling over a 6-inch pulley, making 40 revolutions per minute, will transmit 6 2-10 horse power. If it is a double belt, it will transmit 11 2-10 horse power. If you are figuring on an engine or other source of power to drive this machine, it would be well to allow a considerable factor of safety above these amounts, as most machines require at times a power considerably in excess of the average power which they consume. In answer to your request for a small book containing formula similar to the above, we would refer you to the "Handbook of Practical Mechanics," price $1.00. Information as to how to reach the acousticon has been mailed you.

(9209) W. F. H. writes: Please advise me by mail or through Notes and Queries of the SCIENTIFIC AMERICAN the number of pounds of water which must be evaporated to give one boiler horse power, when the temperature of the feed-water is 32 deg. F., and the boiler pressure 70 pounds. Also when the feed-water temperature is 100 deg. F. and the boiler pressure the same as above. A. One boiler horse power equals 30 pounds of water evaporated from a feed-water at 100 deg. F., and at a pressure of 70 pounds. This equals 1110-3 B. T. A. per pound. It will require 68 more heat units to evaporate from a feed-water of 32 deg. F. Therefore one boiler horse power equals an evaporation of 28¼ pounds under these conditions.

NEW BOOKS, ETC.

DETAIL DRAWINGS OF A FOUR-FURNACE SINGLE-END SCOTCH BOILER. Together with Diagrammatic Pipe and Auxiliary Plan used in Connection with a Triple Expansion Engine and a 1,250-Horsepower Triple-Expansion Engine. With Key Naming and Describing Every Part of the Engine. New York: Reprinted from and Published by Marine Engineering, New York. Price $1.

Detailed drawings of standard machinery carefully lettered and provided with a key are among the most useful means of education and reference in marine use. The detailed drawings of a four-furnace single-end Scotch boiler and a 1,250-horsepower triple-expansion engine are reprinted from and published by Marine Engineering and are excellent examples of this class of work. They are well drawn and the lettering is conveniently disposed, a feature which has been too often neglected in this kind of work. For protection the drawings are inclosed in a cardboard cover.

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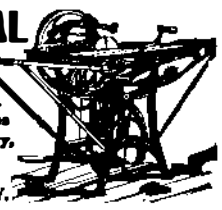

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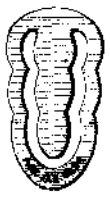

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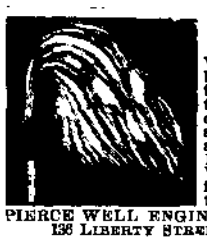

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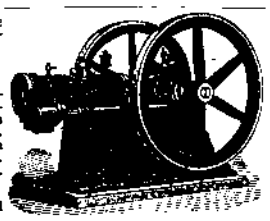

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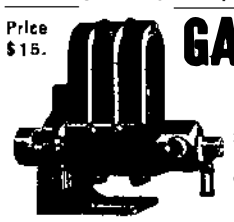

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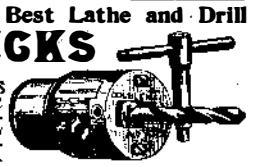

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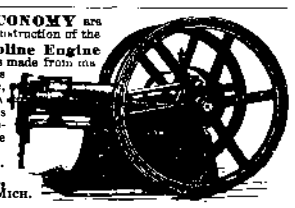

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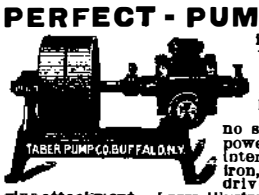

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