Business and Personal.

The charge for Insertion under this headistine Dollar a line for each insertion; about eight words to a line. Adver-tisements must be received at publication office as early as Thursday morning to appear in the following week's issue

Acme engine, 1 to 5 H. P. See adv. next issue. "U.S." metal polish. Indianapolis. Samples free. Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J Best baling presses. Ryther Mfg. Co., Watertown, N.Y. For Sale-5,000 acres coal land, W. L. Kinsey, Blaine, O. Universal and Plain Milling Machines. Pedrick & Ayer, Philadelphia, Pa.

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Stow Mfg. Co., Binghamton, N. Y. See adv., page 254. Screw machines, milling machines, and drill presses The Garvin Mach. Co., Laight and Canal Sts., New York. Centrifugal Pumps for paper and pulp mills. Irrigating and sand pumping plants. Irvin Van Wie, Syracuse, N. Y. Portable engines and boilers. Yacht engines and boilers. B. W. Payne & Sons, Elmira, N. Y., and 41 Dey Street, New York.

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HINTS TO CORRESPONDENTS.

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information and not for publication.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.

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Minerals sent for examination should be distinctly marked or labeled.

(4594) W. F. W. says: Will you kindly advise me through the columns of the Scientific AMERICAN in regard to a rule or formula for calculating the velocity or discharge through small openings? What is the discharge per minute in cubic inches through a hole one thirty-second inch diameter with a pressure of 90 pounds per equare inch? A. The formula for the theoretical velocity of a stream or jet from a small hole in a thin plate is $\sqrt{29 \times \hbar} = \text{feet per second}$, 2 g being twice gravity, 64·166, and \hbar the height or head of water due to the pressure, or 2.3 feet for each pound pressure. This gives a velocity of 6.918 feet per minute for 90 pounds pressure. The area in decimals of a foot multiplied by the velocity in feet per minute gives the volume in cubic feet per minute. The area being for one thirty second of an inch equal to 0 000767 of asquare inch multiplied by the velocity 6918'×12=83016"=63 67 cubic inches per minute as the flow from the orifice The actual discharge from friction and contraction will be about 63 per cent of the above quantity.

(4595) A. L. writes: I notice in your issue of November 5, 1892, an answer to Mr. E. Kurtz's question, "Why are stereoscopic prints reversed?" Yon say that Fig. 3 is transposed prints. But they do not appear as they do in Fig. 1. I think there is some mistake. Be kind enough to straighten me out. A. If "A. L." will carefully read the article to which he refers, he will find this statement with reference to Fig. 2: "Each tube of the stereoscopic camera inverts its own view; therefore, when these pictures are turned a half revolution in their own planes, as shown in the second engraving, they represent the image formed in the camera; and, consequently, the negative as seen from the glass side, also the print from the negative. By placing this double picture right side up, it will be seen that the images have been transposed in the camera in being inverted." It is obvious that these transposed pictures must be again transposed to bring them into the proper position as shown in Fig. 1.

(4596) J. H. M. says: The sewer running from my dwelling in this city to the street main became stopped up, and when the obstruction was re moved, we were very much amazed to find that it had the appearance of being a vegetable growth. The entire pipe for a distance of several feet was filled with what seemed to be a mass of small roots one-tenth inch to much less diameter. The pipe had not been used for two or three months. I am quite certain that there

ago, there was a back water from the main street sewer The part of the pipe where the growth occurred was many feet underground and the whole yard where it runs is covered with concrete. I am anxious to know if you are acquainted with such a thing, how I am to prevent it in future, and where it is likely it came from. The plumber thinks it will grow again. A. The vegetable growth (algæ) is well known to take place in closed pipes containing water that cannot be aerated. A closed tewer pipe is liable to this growth as well as the dead ends of our supposed pure water supply, which, if left over a summer without blowing off, is sometimes found so crowded with algæ of the stronger growth as to be removed with difficulty without opening a full flow at head pressure. It will grow again next season, if the sewer pipe is not often flushed out. The use of more water in household work, and an occasional hot water washout will keep the sewer pipe clear.

(4597) N. Y. Z. says: Will you give a ecipe for making the gelatine-like sheets which are in a duplicator for duplicating handwriting, typewriting and ink drawing? A. Hektograph sheets .- Soak 4 parts of best white glue in a mixture of 5 parts of water and 3 parts of solution of ammonia, until the glue is soft. Warm the mixture until the glue is dissolved and add 3 parts of granulated sugar and 8 parts of glycerine, stirring well and letting come to the boiling point. While hot, paint it upon white blotting paper with a broad-copying brush, until the paper is thoroughly soaked and a thin coating remains on the surface. Allow it to dry for two or three days, and it is then ready for use. An aniline ink should be used for writing, and before transferring to the blotting paper, wet the latter with damped sponge and allow it to stand one or two minutes. Then proceed to make copies in the ordinary way.

(4598) J. D. says: I have a building I want to heat with exhaust steam. Will you please answer the following questions through your paper? Will it heat the building as well or better by carrying the pipes overhead or along the wall close to the floor? Will it heat the building as well or better hy starting at the top floor and working down, or starting at the bottom floor and working upward? Which is the best size of pipe to use? The exhaust pipe from the engine is 4 inches. How high do the pipes need to be above the boiler to trap the condensed steam back into the boiler? We are manufacturers of plows, and would like to know what is the best material or mixture to make hard and tough cast iron. Please give me your opinion as to the best way of heating a building by exhaust steam. A. Overhead piping for exhaust steam heating largely in use now for factories and machine shops. The radiant heat of the larger exposed surface by this system seems to make a heat energy felt in all directions, that does not take place from pipes partly hidden by benches and machinery, placing the coils flat overhead at an average height of 8 or 9 feet, or as far below the ceiling as circumstances will allow, facilitates the convection of heat by the free circulation of air through the spaces between the pipes. This is considered the best system, wherever it can be properly applied. It is better to commence feeding the coils as near the engine as possible, as it makes less back pressure than to carry the exhaust to the top and feed downward. A proper lay out of the plan should give all the coils an equal share of the steam. The best size of pipe for small factories is 11/2 inch, with each coil fed from the main exhaust, and of a size that all the coil connections shall have an aggregate area equal to or greater than the main exhaust The drips should be gathered and led direct to an open tank to separate the oil before being pumped back to the boiler. The water from exhaust steam should not be trapped back to the boiler. No. 2 pig iron, with from 30 to 50 per cent of good scrap, makes a good mixture for plows. The coils for heating should be made with branch tees to lessen the length of circulation. For details, see Baldwin's "Book on Steam Heating," \$2.50 mailed.

(4599) E. E. B. asks: 1. Can old crucibles be used over by crushing them up fine, and mixing cement with and forming them over again? If so, what kind of cement? A. The parts of old crucibles that are free from the melting flux can be ground and mixed with fine porcelan clay, remoulded, dried and baked. 2. Also tell me what they mix with silver ore to get the silver out by melting. A. The fluxes for silver ore depend somewhat on the composition of the ore. The sulphur should be roasted out and the ore reduced with a flux of soda and borax. See Eissler's work on the "Metallurgy of Silver," \$4.25 mailed.

(4600) P. B. asks: What style of pump and power would be most suitable to raise water from wells, one 60 and the other 160 feet deep? How many acres of land can, under ordinary circumstances, be irri gated by means of an ordinary windmill, and how large would tank for reservoir have to be? Who is considered the most skilled and renowned sculptor in the world? A. You will require what is called a deep well pump. If a dug well, the pump cylinder should be placed in the line of pipe within 20 feet of the bottom, with the pump rod on the inside of the pipe and pipe stayed by cross timbers down the well, the numr chamber of any capacity to suit the requirement or flow of well. If a bored or pipe well, the chamber must be restricted to the size of the well pipe and the whole suspended from the top. The water required for irrigation depends entirely upon the climate or the degree of drought. A 16 foot mill will usually take care of 2 acres. A 25 foot mill 6 acres, with a lift of about 15

(4601) R. G. P.—There is no easy way of increasing the gloss on your celluloid collars. The manufacturers finish hair collars in such a way that they may be taken for linen. Remove grease spots with benzine or naphtha.

(4602) W. E. Y. asks: If a gas on expanding does external work, will it require as much mechanical energy to reduce it to its original bulk as though it had expanded without doing any external work? Also where can I procure a gauge or manome-

equare inch? A. The work of compressing a gas is Fibrous material for making pulp, J. & G. Johnthe same, whether it has done work in expanding or not. The variation of temperatures for given volumes is the same for compression as for expansion. You may obtain high pressure gauges from Schaffer & Budenberg, John Street, N. Y.

TO INVENTORS.

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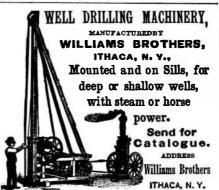


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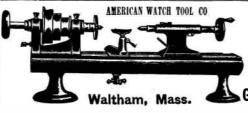






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