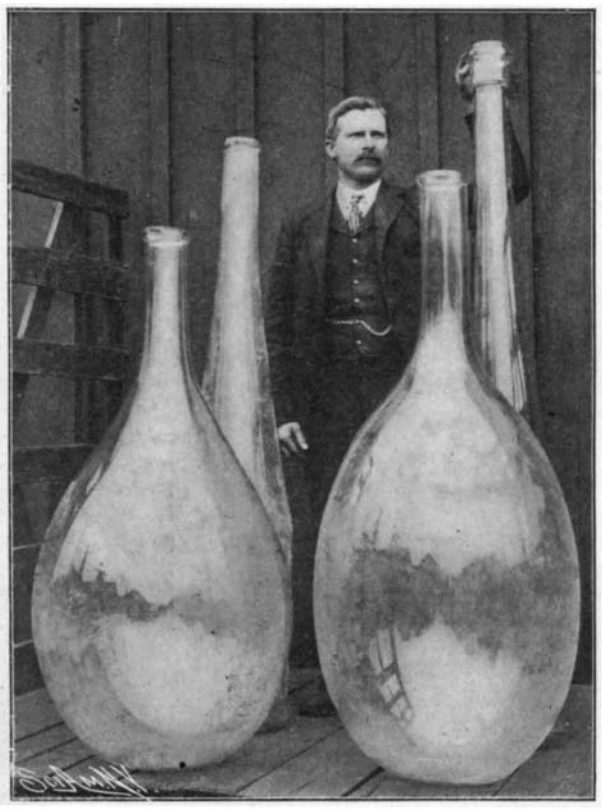
SOME LARGE GLASS VESSELS.

A feat in glass blowing was recently performed at a Western plant for making bottles which, it is believed, is unequaled in its way. An order was given for four bottles to be used for advertising purposes. Two were intended for perfume, another for wine, and another for toilet water, the idea being to make a show-window



A FEAT IN GLASS BLOWING.

display of these articles. As a result the quartet were produced which are illustrated in the accompanying photograph. By comparing them with the man standing in the rear, an idea can be gained of their truly mammoth dimensions. The bottles range in height from 5 feet 4 inches to 6 feet 4 inches. The largest bottle is 30 inches in diameter at its greatest width, holding no less than 55 gallons liquid measure. The smaller ones are intended for perfumery, and it is a fact that a single one of these will contain the contents of nearly 1,500 of the ordinary-sized perfumery bottles used on toilet tables, while the wine bottle represents the capacity of 250 ordinary pint bottles.

As already stated, these huge receptacles were made in the usual manner at the works of the Illinois Glass Company at Alton, Ill. Three of the most expert blowers were employed, and the quantity of liquid glass required for the largest bottle was no less than 50 pounds. This was drawn, rolled, and inflated, the blowpipe used being 5½ feet in length. Owing to the quantity of material needed, it was necessary to reheat it several times in order to complete the process; but as the photograph shows, the bottle is very well proportioned. In this portion of the work about an hour was required, after which the rings at the mouth were finished and the glass annealed in specially large ovens.

The bottles have been completed for a firm of druggists in St. Louis, and are placed in the show window, where they attract much attention. D. A. W.

A STILL FOR AMATEUR AND CLASS-ROOM WORK.

BY THOMAS R. BAKER.

A simple, inexpensive, and very efficient form of still, suitable for class-room and amateur purposes especially, is shown in the accompanying cut.

The vessel in which the liquid to be distilled is heated is a Mason quart fruit jar. A jar with an all-zinc top must be used, and the porcelain disk be broken out. The distillate tube is a piece of half-inch tin-lined lead pipe about three feet long. One end of the tube, curved at a somewhat acute angle with the long section, is fitted into a hole made through the top of the zinc cover, and soldered to the cover. This tube is passed through a tube made of tinned iron, or other sheet metal, about two and one-half feet long and two inches in diameter. The ends of the large tube are closed about the smaller one by passing the latter through holes in stoppers fitted to the ends of the large one. The large tube has short lateral tubes at its ends.

This arrangement will allow water to run into the large tube at its lower end and out at its upper end. This condensing apparatus is a form of Liebig's condenser. The condensing may be more simply done by wrapping the tube with a strip of loosely-woven fabric, adjusting it in an inclined wooden trough, and letting cold water run slowly upon its upper end, or the condensing will be more complete and rapid if cold water be allowed to drop upon the pipe at places two or three inches apart throughout its length from a vessel suspended above it.

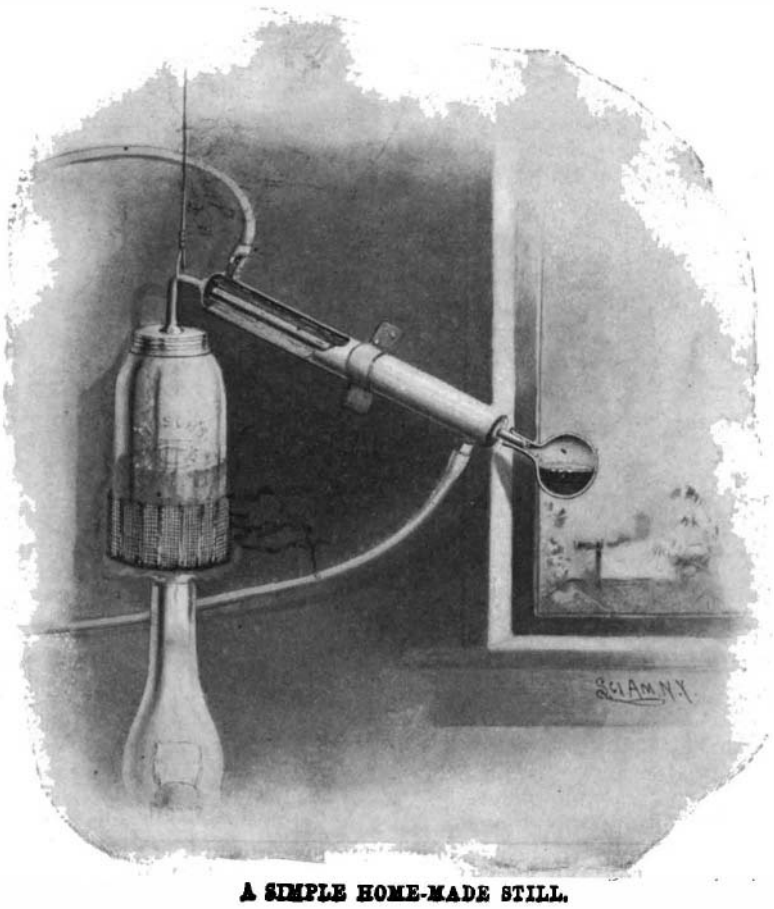
The bottom of the fruit jar should be covered with a piece of wire window screen to distribute the heat. A woven-wire hood or cap may be made for this purpose, to easily slip on and off the jar by properly folding a piece of the screening about six inches square.

The heating is best done with an ordinary kerosene lamp, as a gas or an alcohol flame might break the jar. The flame should be low at first, and the heat increased slowly. The contents of the jar will soon begin to boil, and there is little danger of the vessel's breaking with the strongest heat that the lamp can give.

I have the condenser of my apparatus attached to the woodwork of a window of my classroom. The lamp is supported on a shelf attached to an adjacent wall, and the distillate receiver is opposite one of the window panes.

The jar is supported by the cap, soldered as above stated, to the end of the condensing tube, and is simply screwed into place when the jar is charged for heating, and unscrewed when the jar is to be emptied. It is best to use two rubber bands, in order to secure a good joint between the cap and the jar.

I have used the apparatus a great deal and very profitably in class instruction to show the preparation of alcohol, essential oils, products obtained from flowers, and to obtain various other distillates; and it might be very conveniently employed in various amateur pharmaceutical operations.



A SIMPLE HOME-MADE STILL.

TWO NEW HACK SAWS.

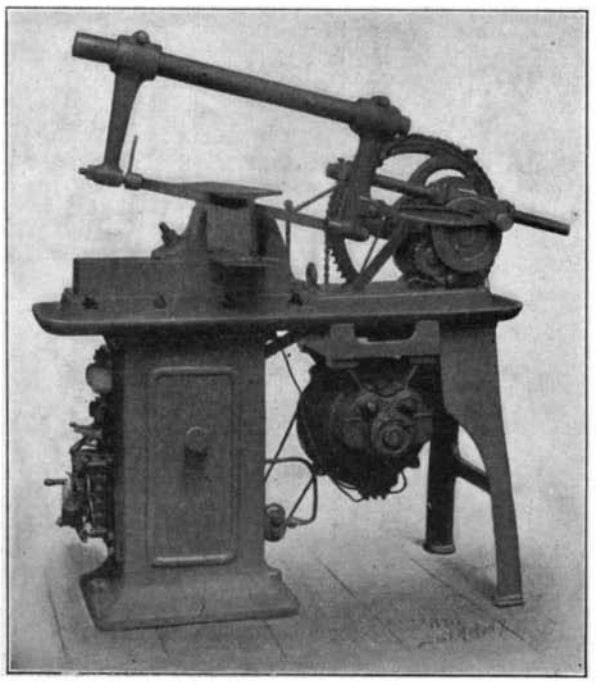
A new type of double hack saw for cutting steel girders and similar structures has been devised by Mr. Whitley, of England. The machine is distinguished by its increased capacity, double speed, and continuous cutting. It is designed on quite new and novel lines, and yet is simple in principle and construction. It has two saws working alternate strokes, a saw being placed on either side of the section to be cut, as may be realized from the illustration. By this arrangement the time occupied in the cutting operation is only half of that required to accomplish the same task by means of one saw. An evidence of its speed is shown by the sawn pieces of a 12 x 5-inch girder in the engraving, which were cut off in less than twenty-five minutes.

The machine is substantially constructed, and instead of being fitted with vises to hold the material to be cut, it is provided with a planed slotted table on which any section, regular or otherwise, can be bolted. Another prominent feature of the contrivance is that it will cut at any angle, even sawing the webs out of crank-shafts.

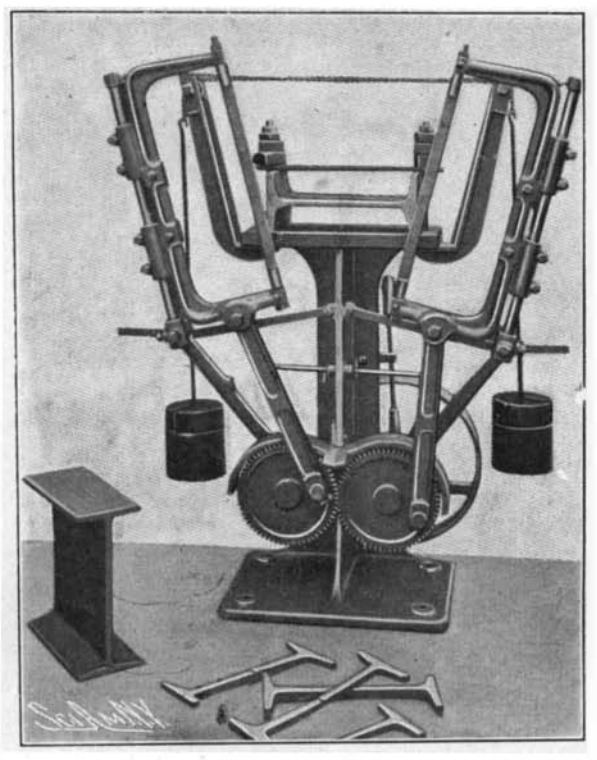
The bows or arms carrying the saws are stoutly and strongly constructed, so that it cannot get out of order, and to insure true cutting. By means of a novel attachment the blades are inserted perfectly straight, and in cutting through a 12 x 5-inch girder, for instance, the blades will not deviate 1-32 of an inch.

The feed is simple and direct, dispensing with the necessity of ratchets or other wearing devices. There are two weights attached to chains on either side, one connected to each bow. The latter is thereby drawn forward independently, and the feed can be suited to the keenness of the blade or the nature of the material to be cut, by means of the weights. The chains can be unhooked, and the bows at once thrown back to insert or remove the work. The bows are held back in any position by catches on the rods, which may be seen projecting at the right and left of the machine just above the weights in the illustration. By a novel and simple arrangement, one of the bows on reaching the center of the cut is pushed back sufficiently to permit the other bow to come through and complete the cut.

The gear wheels are machine-cut, and the slides or guides are adjustable, so that all wear can be taken up. The machine is very compact, and only weighs 3½ hundredweight. It will take material up to 14 x 9 inches. The stroke is 5½ inches; the table, 16 x 8



AN ELECTRICALLY-DRIVEN HACK SAW.



NEW TYPE OF DOUBLE HACK SAW.

inches; the pulley, 14 x 3 inches, with 65 revolutions per minute; and the blades, 17 x 1 inch, 16 gage. The machine constitutes a handy and quick-working tool for this class of work.

Another English saw, which deserves attention, is the invention of Mr. Edward G. Herbert. It is designed to replace circular and band saws, which are high-priced and expensive by reason of their consumption of energy and cost of maintenance. This saw is characterized by the inclination of the blade, which changes periodically by means of an eccentric movement that causes the blade to cut constantly at an angle instead of distributing its action over the entire width of the piece to be sawed. The speed with which the sawing is accomplished is greatly increased thereby, and may be still further augmented by the use of an arrangement that produces a circulation of soap-suds. In this case, the machine is capable of operating at 100 revolutions a minute.

The machine, which is represented in the accom-

panying figure, is capable of sawing bars and girders of 8 x 12 inches. The motor, which is situated under the table, is of the constant speed, inclosed type. It is designed for a speed of 600 revolutions a minute. The driving shaft of the saw is run by a chain, and a speed reduction of 6 to 1 is employed, which gives it a speed of 100 revolutions a minute. The rheostats are fixed to the pedestal, and this permits of the machine being moved about bodily and especially of being lifted by a crane, since there is a ring secured to the machine for this purpose. The current for operating the motor may be taken from an electric light main by means of flexible wires and a lamp socket. The pedestal contains a tank for the lubricating fluid. The table is surrounded by a gutter, and a small force pump, with accessories, keeps up a constant flow of the lubricant. The saw clamp may be fixed obliquely, so as to allow the blade to saw girders, etc., at an angle. It may even be removed, so that the pieces may be bolted to the table itself, which is provided with T-mortises.

The machine, which may be driven by other kinds of motive power than electricity, will probably soon be adopted by metallurgical works and iron establishments, and be utilized at places where metallic constructions are in course of erection, where it will undoubtedly render valuable services.

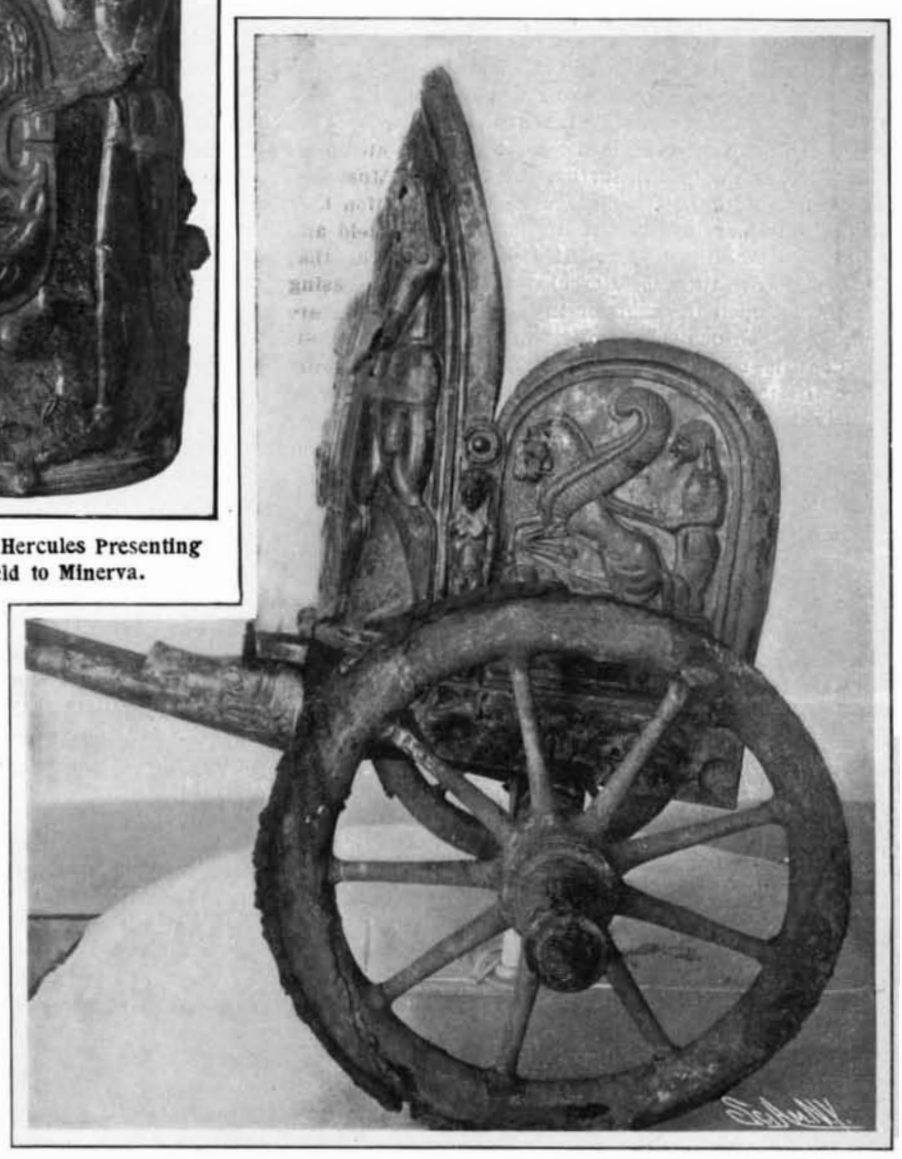
A REMARKABLE EARLY GRÆCO-ROMAN CHARIOT.

Last January Gen. Di Cesnola, director of the Metropolitan Museum of Art, learned that there was offered for sale in Paris a chariot which had been dug up by some peasants in Italy at the foot of a hill called "Il Capitano," beneath which the road from Monteleone led to Norcia, the ancient Etruscan city of Nursia, fourteen miles distant from Viterbo. The price asked was more than even some of the most richly-endowed institutions could afford to pay. Through the munificence of the late Jacob S. Rogers, the well-known locomotive builder, who bequeathed much of his large fortune to the Metropolitan Museum of Art, Gen. Di Cesnola was enabled to buy the relic for 250,000 francs ($48,382). The *biga* has now been mounted for public inspection in the museum, and forms not only a rare example of pre-Roman art, but also a most skillful bit of restoration.

The chariot was found in a sepulcher amid a litter of earth, rubbish, and scattered utensils. Although the wooden body had crumbled into dust, still the few remnants showed that black walnut was the material which had been used in its construction. The ornamented bronze sheathing which covered the frame was found in a most remarkably well-preserved state. There seems to have been an ivory rim for the chariot body. The ivory fragments have been carefully preserved, and a few have been mounted upon a

The Front of the Chariot. Hercules Presenting His Helmet and Shield to Minerva.

One Side Panel, Representing Hercules Killing Laomedon, Father of Priam.



The Other Side Panel, Representing Hercules Killing One of Laomedon's Children.

AN ETRUSCAN BIGA OR CHARIOT, USED PROBABLY ABOUT 600 B. C., FOUND AT NORCIA, ITALY, AND ACQUIRED BY THE METROPOLITAN MUSEUM OF ART.