The Lick Observatory Astronomers.

At a recent meeting of the Board of Regents of the University of California, the special committee appointed to consider the resolution accepting the resignation of Edward S. Holden as president of the university, and resolutions appointing the director of and the astronomers in the Lick Observatory, and resolutions appointing a secretary and librarian, and also a machinist, a laborer, and a janitor, reported through A. L. Rhodes.

The resolutions, as adopted, are as follows:

That the resignation of Edward S. Holden as president of the university be accepted.

That Edward S. Holden be, and he hereby is, appointed as director and astronomer of the Lick Observatory, subject to the control of the Board of Regents.

That S. W. Burnham, A.M., be, and he hereby is, appointed as astronomer, with a salary of $3,000 per annum. That J. M. Schaeberle, A.M., be, and hereby is, appointed astronomer with a salary of $2,000 per annum.

That J. E. Keeler, A.B., be, and he hereby is, appointed astronomer with a salary of $1,400 per annum.

That E. E. Barnard be appointed astronomer at $1,200 per annum.

That the following be appointed: John McDonald, machinist, $700 per annum; Chris. McGuire, laborer, $720; and Charles Harcort, janitor, $720.

That a secretary and librarian be appointed.

That a committee of three regents be appointed, who shall be authorized to make necessary arrangements for the conveyance and delivery of the Lick Observatory, the lands upon which it stands, and the property and money in the hands of the Lick trustees, which are required by the deed of trust to be turned over and delivered to the Board of Regents.

The committee to which was referred the orders of the board relating to the Lick Observatory submitted the following report, which was adopted:

That the official designation of the Lick Observatory and telescope on Mount Hamilton shall be "The Lick Astronomical Department of the University of California." The balance of the $700,000 given by Mr. Lick for the foundation and endowment of the observatory, and such other sums as may from time to time be given, shall be known as the Endowment Fund of the Lick Astronomical Department of the University of California. That students who are graduates of the university and colleges of like standing shall be received at the observatory as students to pursue a higher course of astronomy.

The resignation of the president of the university is to take effect when the observatory is formally turned over to the regents. Prof. Holden's salary is $5,000 per annum.

Calcareous Water.

The Weavers' School of Aix-la-Chapelle writes as follows to the *Centralblatt f. d. Textil-Industrie:*

"The reply by another correspondent published by you compels us to again take up the subject. The writer advises to soften the water by an addition of milk of lime. We, however, would most seriously warn parties against doing it. It is true that carbonate of lime in water can be precipitated by milk of lime, because the excess of carbonic acid, without which the lime cannot remain in solution, becomes fixed. But the vital question in the matter is, How much milk of lime is to be added? The operator would have to know to a nicety how much carbonate of lime is contained in the water, and how much caustic lime is contained in the milk of lime.

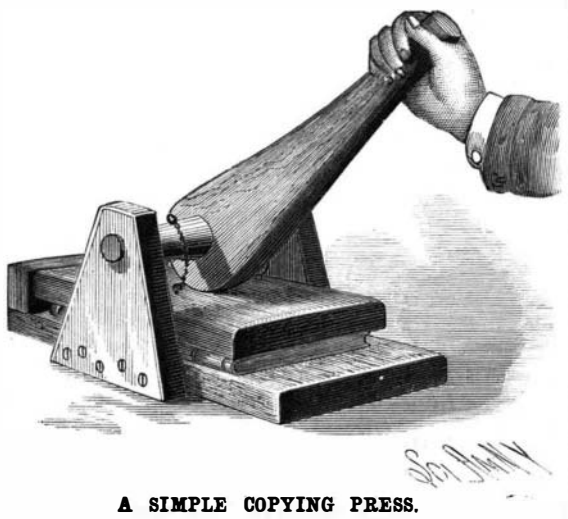
"But can this be established with precision in every case? To be added to this difficulty is the fact that milk of lime cannot be kept in the open air, because the caustic lime will change into carbonate of lime, whereby the entire solution loses its strength. The greatest danger, however, is that the operator will add too much milk of lime to the water, which addition, in place of making the latter softer, will make it very hard; and if he uses it at once, when the reaction of the water containing an excess of milk of lime is still alkaline, he may experience a number of undesirable accidents, both in washing and dyeing.

"The main point of the question, however, has not been touched upon at all by the respondent. The hardness of the water is most generally due, not to carbonate of lime, but to sulphate of lime (gypsum). Can this also be precipitated with milk of lime? As we stated in our answer, nothing is good except the addition of solution of soda to the boiling water, which process has time and again shown its efficacy, and has therefore stood the test of experience. The gypsum is thereby at once converted into carbonate of lime, and since all excess of carbonic acid has been expelled by boiling, it is precipitated at once."

MOISTURE-PROOF glue is made by dissolving 16 oz. of glue in 3 pints of skim milk. If a still stronger glue be wanted, add powdered lime.

A SIMPLE COPYING PRESS.

We illustrate in the present issue a very simply constructed copying press. Its construction is so clear that little description is required. It was devised by Mr. O'Rourke, one of the constructing engineers of the Poughkeepsie bridge. A wooden cam rotates in suitable bearings, and when turned, by pulling forward the lever, forces the platen downward upon the copying book. When the lever is pushed backward, it not only relieves the platen from pressure, but also raises it. This it does by a short chain or wire attachment which

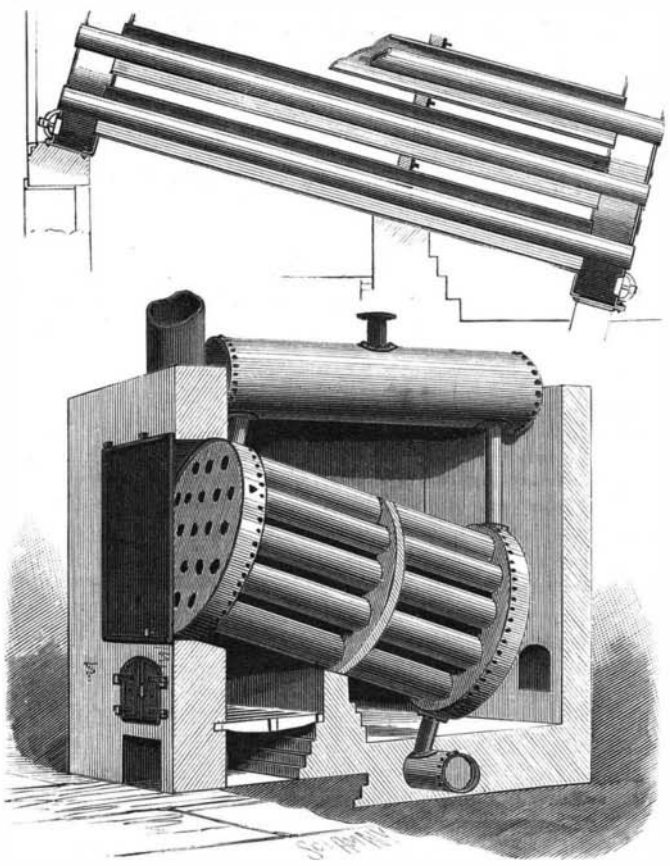


A SIMPLE COPYING PRESS.

is wound around the axle or drum to which the cam is attached. It is all made of wood, except as regards the nails or bolts and the chain.

AN IMPROVED STEAM BOILER.

A steam boiler designed to give a maximum amount of heating surface, in order that steam can be generated with the smallest possible amount of fuel, has been patented by Mr. Oliver H. Gentry, of Opelousas, La., and is represented in the accompanying illustration. The boiler is preferably set at an inclination, as shown in the view in perspective, and each of its ends consists of a circular drum, through which extend flue tubes, passing through both front and rear drums, these flue tubes being surrounded by water tubes, opening into the interior water spaces of the drums. A mud drum is arranged transversely under the lower side of the rear drum, with which it communicates through a short vertical pipe, and a steam drum arranged horizontally over the boiler is in communication with the top portion of the water drums at both ends by vertical pipes. The tubes are expanded in the tube sheets, and the setting shown is designed to represent about the proper angle to insure the best circulation. When the boiler is filled, the water in the drums and tubes entirely surrounds the flues, and the products of combustion, after circulating around the tubes until they reach the rear drum, are deflected downward to its rear side,



GENTRY'S STEAM BOILER.

thence passing forward through the flues to the stack at the front, up which they escape.

IODIZED starch has been recommended as a substitute for iodoform, on the ground that iodoform owes its power to the iodine given off from it.

A New Departure in Brazing and Welding.

Mr. Thomas Fletcher, the well known gas engineer, writes to the *Journal of the Society of Arts*, London, as follows:

"The cheapening of oxygen by Brin's process of manufacture has put into the hands of metal workers a new power. I have recently made a few experiments with the compressed oxygen and coal gas, and found that with ½ inch gas supply a joint could be brazed in a 2 inch wrought iron pipe in about one minute, the heat being very short, the redness not extending over 1 inch on each side of the joint. The appearance of the surface after brazing led me to experiment further with welding—a process which is not possible with ordinary coal gas and air, owing to the formation of magnetic oxide on the surfaces. Contrary to my expectation, a good weld was obtained on an iron wire ½ inch diameter with a very small blowpipe, having an air jet about $\frac{1}{32}$ inch diameter.

"This matter requires to be taken up and tried on a large scale for such work as welding boiler plates, which, it appears to me, can be done perfectly with far less trouble than would be required to braze an ordinary joint. The great advantage of this would be that the boilers would require no handling, but could be welded with an ordinary large blowpipe in position, and with about one-tenth the labor at present necessary. The cost of the oxygen is trifling, and it is evident from the results obtained in brazing that the consumption of gas would be considerably less than one-fourth that necessary with an air blast, irrespective of the fact that welding is possible with an oxygen blast, whereas it is not possible if air is used. The surface of iron heated to welding heat by this means comes out singularly clean and free from scale, and a small bottle of compressed oxygen with a blowpipe and a moderate gas supply would make the repairs of machinery, boilers, brewing coppers, and other unwieldy apparatus a very simple matter. The trouble and difficulty of making good boiler crowns, which so frequently come down, would be very small indeed when the workman has an unlimited source of heat at command, under perfect and instant control."

The Manufacture of Aluminum.

Works for the manufacture of sodium by the Castner process and its conversion into aluminum under the process of Mr. James Webster are now being erected by the Aluminum Company, of St. Mary Axe, London, at Oldbury, near Birmingham, which, it is expected, will bring an important trade to the district. The process of sodium production, which has been invented by Mr. H. Y. Castner, New York, has already been described.

By this process the cost of sodium is reduced from 4s. to 1s. per lb., and of aluminum from 60s. to less than 20s. per lb. The aluminum is produced in pigs of 4 lb. weight. The same sized pig of the alloy known as aluminum bronze, copper and aluminum, weighs 12 lb. —a fact which strongly illustrates the relative lightness of aluminum. Its value is further increased by its tensile strength and its non-liability to oxidize. It is obvious that the manufacture of this reliable metal upon an extensive commercial scale at a much lower cost than hitherto involves important consequences to English metallurgical industry.

The new works at Oldbury occupy 4½ acres of ground, and they will be capable of producing £300 worth of aluminum per day. The number of men to be employed is not yet definitely decided upon, and in aluminum manufacture extent of production is indicated more by the amount of machinery plant than the number of workmen engaged. At Oldbury there will be four furnaces, each with five chambers, for the manufacture of sodium, and a number of other furnaces which have yet to be erected will be used for making chloride of aluminum and the aluminum itself. The furnaces will be fired by eight Wilson gas producers. The gas from these will be carried to the furnaces through pipes, and as there will be a separate valve to each furnace, the supply of heat will be regulated without difficulty. All the coal consumed at the works will be brought by canal. There is a special creek running into the works. On the other side of the works runs the line of the Great Western Railway Company. Just opposite the works, on the other side of the canal, is a manufactory of chemicals, and from this establishment will come the soda and certain of the other materials used in the production of aluminum. At the Solihull works of the company the co-metal is already being turned out, and is being received with considerable favor. Many metal-working firms are using an alloy of aluminum and copper—90 per cent of the latter to 10 per cent of the former—and express much satisfaction with its qualities. The new works are being rapidly erected, and it is expected that full work will be begun in March. One of the chimneys, which is 150 feet high, with an internal diameter of 6 feet, is already completed; and another, 180 feet in height and 8 feet across at the top, is already about half built.—*Iron.*