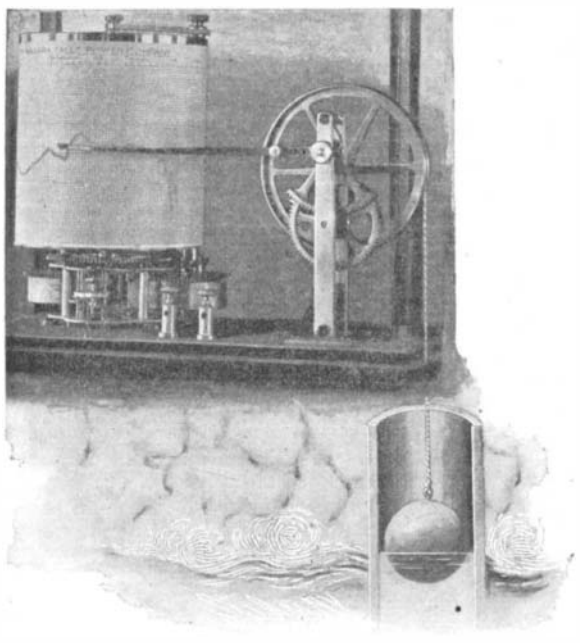
A USEFUL INSTRUMENT IN THE NIAGARA FALLS POWER HOUSE.

BY ARTHUR E. WEEKS.

At the great power plant at Niagara Falls, New York, an accurate record of the depth of the water both in the forebays and in the immense underground tunnel must be constantly at hand. The depth of the water varies, with a high east wind, as much as three feet; and these winds always bring about an extra rush of grass in its season, which finds its way to the racks before each forebay. This grass would in an exceedingly short time, if not removed, cause the disabling of one or more dynamos, by ruining their thrust bearings.

The instrument herewith illustrated is a useful and valuable one, showing at a glance the height of water in the forebay. A cord is passed once around the large wheel at the right, which is grooved to hold it in place, one end being secured to the wheel, while the other is attached to a float. This float is usually contained in a large pipe, in order to prevent injury to the same. When the float rests upon the water, the needle is adjusted to the measured depth of the water, and is then set. A coiled spring assists in the return, and steadiness of the needle. The scale on the chart is properly proportioned for time and height of water. It takes considerable wheel travel to make much variation in the needle movement. Two binding posts are shown, which admit of connecting in a battery and bell, with contacts designed so that the alarm bell rings when the water has gone down to the danger mark. If used on a tank service, this would be a signal to start the pump, if the pump did not work automatically. When, as frequently happens, the water is dangerously low, men are at once set to work to rake away the grass from the racks before the forebay is affected. The recording device also makes a continuous record for twenty-four hours, when the



AN INGENIOUS WATER GAGE IN USE AT NIAGARA.

chart is removed and placed on file, and a fresh one substituted. These chart records serve their purpose well, furnishing a complete and accurate reference for consultation at any future time, should it be desired to obtain knowledge of conditions prevailing at any stated period.

A bearing of the 5,000 horse-power generators would be burnt out if the water were allowed to become too low in the forebay, at which time the pressure of the revolving parts is downward. A bearing would be ruined also if the oil supply were accidentally stopped, or not turned on when the generator was started. The water gage shows whether the trouble is due to low water or to other conditions.

Down in the immense tunnel beneath, where the water dashes in wild fury as it is lashed about in its exit from the huge turbines, this measuring instrument is of great value. The depth of water in the tunnel is closely watched with each increase of power, this meaning more or less increase in height of water in the tunnel. Any back pressure from the water, caused by its rising above the turbines, would of course mean a loss of power at the dynamo.

During the winter and late into the spring, in the time of running ice, and while the troublesome anchor ice is forming, the chart proves its inestimable value. Anchor ice forms very quickly, and the men are constantly on the alert to detect its formation, when the racks must be at once removed, lest their openings freeze over, thereby cutting off the water supply to the turbines and destroying their thrust bearings. The chart indicates at all times the exact conditions prevailing.

The United States government has a number of these valuable instruments in use at Erie, Buffalo, and elsewhere. The device is the invention of Joseph Wills, master mechanic of the Niagara Falls Company.

INSULATING APPARATUS FOR CANNED GOODS TO PREVENT PTOMAINE POISONING.

Now that preserved tinned or canned foods, such as meat, fish, fruits, and other comestibles, constitute such an important factor of commerce, it has become imperative that the contents should be protected from any organic or chemical action that may be set up, either through the contact of the edibles with the metal of the tin, or the solder with which the lid and can, when filled, are sealed. Indeed, the liability of ptomaine poisoning arising from many of these causes constitutes one of the gravest dangers of the tinned preservative, and is one of the most difficult problems that has to be surmounted. Many devices have been contrived to secure this desideratum, but they have proved only partially successful.

An ingenious invention has, however, now been devised, by which all possibility of the preserved contents coming into contact with the metal lining of the tin has been entirely and successfully overcome. The apparatus is the idea of Mr. James Dowling, of London, and has already been adopted by one of the most prominent canning firms of Great Britain.

The principle of this contrivance is that a lining of parchment—this substance is preferable, as it is impervious to any of the liquid exuding from the preserved comestible—paper, or some such similar material is fashioned, in which the article of food is placed. By this means it is impossible for the edible to come into contact with the tin at any part, and therefore all possibility of ptomaine poisoning from this cause is absolutely obviated.

As may be seen from the accompanying illustration, the apparatus is of simple design and operation, so that it can be manipulated by a boy, girl, or an unskilled workman. The apparatus comprises four cardinal features, as follows: A solid shaped plunger or block, slotted and fitted to a vertical slide for the accommodation of expanding and receding pleating blades; a guide tube, for holding the material to be shaped in position; a metal plate grooved to correspond with the pleat-forming blades, for the passing of the material to be shaped or formed; a metal cylinder slotted vertically, for the reception of the pleated material. This cylinder rises vertically, and by a rotary movement releases the pleats from the slots, while the same movement presses the formed pleats, and completes the shaping of the insulating linings.

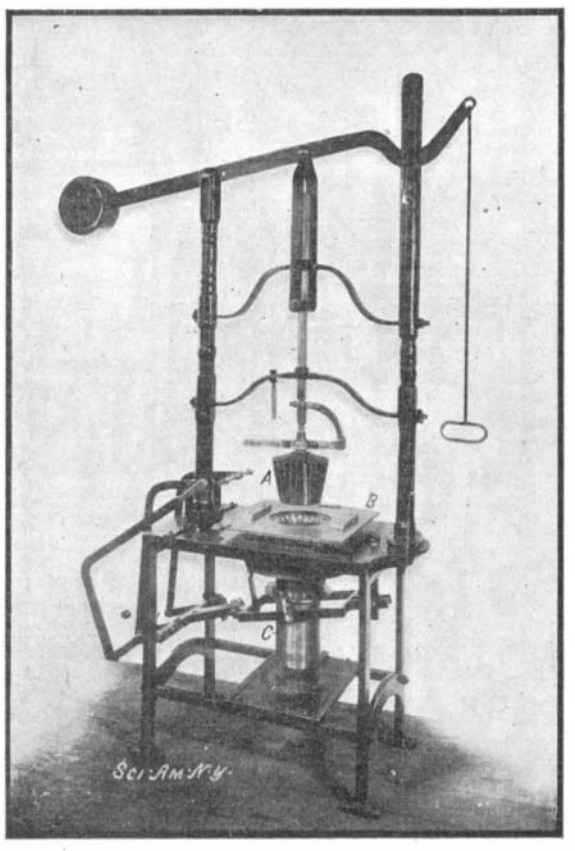
There are two plates fitted to a table, forming a rigid part of the machine, each of which has a central hole, the diameter of which is slightly less than that of the tin it is to fit. These two plates are hinged at the rear. The operator lifts the upper plate in the same manner as if it were the lid of a box, and then slides the sheet of parchment or whatever material is used over the hole in the lower plate. This sheet has been previously cut into circular form, and there is a circular guide to carry it in the proper position upon the lower plate. By this means the hole in the latter is bound to be centrally placed below the center of the disk of parchment. The upper plate is then closed down flat in its normal position upon the sheet of parchment. In order, however, to prevent the plates holding the paper too tightly, the upper one is provided on its under surface with a number of radial ribs, while all around the hole in the lower plate are a number of projections and recesses, conforming to the shape and the depth respectively of the blades on the plunger or die.

When the parchment has thus been inserted and closed down, the plunger is forced down upon it by means of a lever controlled by a handle. This plunger constitutes an important part of the mechanism. It consists of a disk with a number of radial blades pivoted to it on a sleeve. This latter mechanism is made detachable, so that a die of any desired pattern may be fitted if necessary. The plunger forces the parchment through the plate shaped to carry the radial blades of the plunger. Below this plate is a cylinder, which is slotted in a manner corresponding to the pattern of the die. This tube or cylindrical folder, as it is called, is brought into operation with another lever. As it rises, it rotates, and the plunger rises also, releasing the lining a little. The folder in its action folds over the pleats of the parchment formed by the plunger striking it. The machine relapses back into its normal position by means of counterbalance weights, and the finished shaped lining is withdrawn.

The finished insulating lining is slightly deeper than the tin into which it is intended to be inserted. Furthermore, there is the top to be fitted. This latter operation is accomplished upon the tinning machine. The lining is placed in the machine together with its edible contents. The top lining comprises a circular disk of parchment, which is cut the same size as the top of the tin. The lid is not attached by means of solder, but it is "spun" on This operation is accomplished as follows: The tin with its contents is placed in the canning apparatus. The disk of parchment is then placed over it, and then the lid of the tin. A sharp rotary movement is imparted to the tin, and at the same time pressure is applied to the lid. This forces down the projecting rim of the parchment lining, and this edge, together with the edge of the top disk and the tin lid, are spun into the form of a beaded edge right round the top of the tin, thus sealing it, and rendering it absolutely air-tight.

When the tin is opened, the insulating lining is removed with the preservative within, and turned out upon a dish. The provision of this insulating lining not only acts as a preservative safeguard against the comestible touching the metal of the can, but also enables the contents to be withdrawn with perfect ease, and served with a more appetizing appearance.

This ingenious machine enables the insulating linings to be turned out quickly and cheaply. Although the provision of such linings has long been recognized as the best possible solution of the ptomaine poisoning difficulty, yet it has not been widely adopted, owing to the high cost of preparing the linings by hand. One operator, even when extremely dexterous, can only produce one lining in about six minutes. With this machine one operator, however, can fashion ten linings per minute, or about 600 per hour. In a practical test it has been ascertained that one operator with this machine can manufacture the same number of linings in a working week as sixty operators working the same number of hours can shape by hand. The actual cost of manufacture is very small, including the



A. Plunger. *B*. Plates between which paper is placed. *C*. Cylindrical folder, which folds over the pleats made by the plunger.

INSULATING LINING APPARATUS FOR TINNED FOODS TO PREVENT PTOMAINE POISONING.

cost of the material, and does not increase the cost of preparing a tin of food to any appreciable extent. It is hoped in England that, owing to the frequency of ptomaine poisoning cases, it will become compulsory to provide the tins with some such linings as are made by this machine, in which event it will have a great future.

The Current Supplement.

The current SUPPLEMENT, No. 1487, opens with an illustrated description of the power plant of the city of Geneva, written by the Paris correspondent of the SCIENTIFIC AMERICAN. Prof. Storm Bull recently read before the Western Society of Engineers, an exhaustive paper on superheated steam in which he reviewed its development and use. The paper is published in full in the current SUPPLEMENT. The experiments of Emile Guarini in using the earth as a return conductor for commercial electric installations are fully described. Mr. W. H. Holmes presents an interesting account of the shell ornaments from Kentucky and Mexico. "Improved Methods of Producing Color Values for Monochrome and Three Color Printing" is the title of an article by Mr. John Carbutt. An inquiry into the working of the various water softeners was recently conducted by Messrs. C. E. Stromeyer and W. B. Baron. The results of that inquiry are published. The English correspondent of the SCIENTIFIC AMERICAN describes a machine for measuring screw threads, installed at the National Physical Laboratory in Great Britain. In an article entitled "Some Novel Phenomena in Connection with N-Rays," convincing photographic proof is given of the existence of these radiations.