HOW TO MAKE PAPER FRICTION WHEELS.

BY B. F. FELLS.

The subject of paper friction wheels, which has been discussed to some extent by the technical press, is an interesting one to power users.

I became convinced years ago that, with very few exceptions, a suitable quality of paper stuff would make

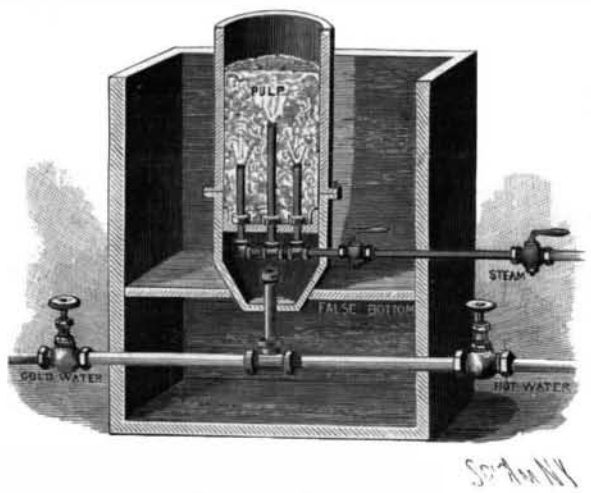

Fig. 1.—PULP MIXER.

a durable friction surface. In my experience with these paper wheels I have always used a special mixture of pulp, seeking to get a combination that was as hard as could be worked to advantage and very fine grained. I accomplished this by using a large percentage of selected stock in the mixture. I procured some high grade unbleached sulphite pulp and used this as a base, adding to it small quantities of vaseline, after which I put the pulp through a special device for further working, a drawing of which is shown.

The apparatus consists of a cast iron central pipe, cone-shaped at the bottom and fastened to the false

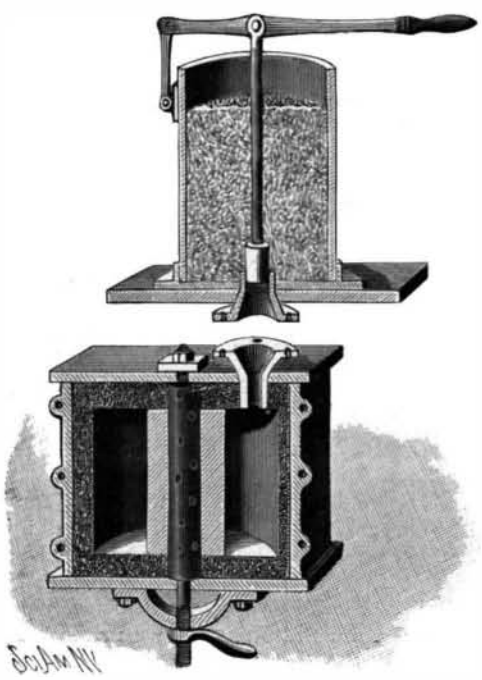

Fig. 2.—SECTION OF MOULD AND MOULD FILLER.

bottom of the pulp tank. The tank is made of wood. Three small pipes are fixed to a center piece vertically and arranged to connect with the steam pipe. The object of these pipes is to distribute steam jets in the mass of pulp and free the fiber. It will be noticed that the upper and lower portions of the pipe are joined by a flanged joint. After steaming and stirring the pulp thoroughly in this pipe, I lift off the upper part, and let the pulp fall to the false bottom of the tank. I then open the hot water valve and let a deluge of hot water come in through the spout which leads into the cone, and overflows to the pulp on the false bottom of

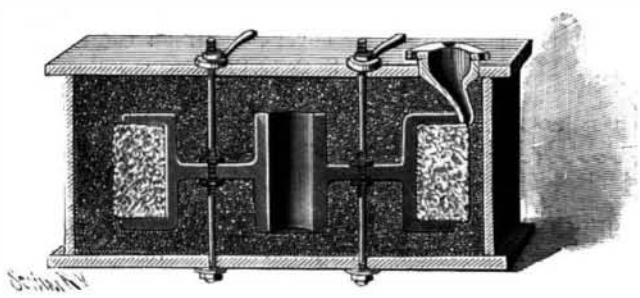

Fig. 3.—MOULD FOR LAGGING IRON WHEEL.

the tank, carrying before it any of the pulp that remained in the lower part of the pipe. Next I rinse off by flowing in cold water in same way. Time for steaming, about 3 hours. For hot water bath I allow 20 minutes, for the cold wash 10 minutes. I now let the pulp lie a few days until it is in good condition for moulding, and then shape it into disks, half disks, quarter disks, and eighth disks, during which operation I add glue. It is a very difficult matter to tell which grade of glue will suit. The so-called waterproof glue consists of glue and carbonate of lime, or glue, zinc white, and alcohol. Glue for preparing most pulp articles is a mixture of glue, "stick," and sulphate of zinc. This kind of glue seemed to me to be the best for the purpose. The illustration, Fig. 2, relate to the casting of the pulp. This figure shows a section of the type of mould used for casting the pulp.

The upper part of Fig. 2 shows a cylindrical cast iron tube with a bottom and a top or lid. The bottom is preferably watertight, and packed and locked with a screw the same as used in curb boxes. The connections to the gate are slip joints packed with a rubber ring, which is slipped into a groove in the end of the sockets which are attached to the outlet. After the device is attached to the gate and filled with pulp, it is only necessary to raise the lever, when the plunger is elevated and the pulp runs through to the mould.

In pouring in this manner, the pulp is taken from the bottom, avoiding the use of pulp which has contracted from the effects of the atmosphere. I have used a mould similar to that shown in cross-section in Fig. 3 for casting a lagging on a wheel. The wheel form is supported on the stubs, and the cope is rammed up with sand with the pouring gate, as indicated.

By this method the pulp is cast on the wheel entire, there being no breaks at joints, as in the divided lagging. Next comes the special operation for rendering the paper wheels suitable for use. In the rough state the surfaces are firm, but lack the necessary properties of a friction wheel when the lagging is dry. Skillful applications of tallow mixtures bring about the desired end, and pure ox tallow may be applied to the wheel face mechanically by the use of the device illustrated in Fig. 4, in which a tank (not shown) contains the melted tallow mixtures which are put upon the surface of the lagging through the brush.

This brush is a hollow metal shell supplied with handles and hog bristles. The tallow ingredients being kept in a liquid state by the steam admitted through the pipe, and the flow being governed by the valve, the operator has only to guide the brush over the surface of the wheel. The latter is revolved rapidly on a shaft. The tallow mixture can be made from pure ox tallow, previously melted and maintained at a temperature of 170° F. Pure ox tallow is effective, but at times more suppleness may be got by adding an ounce of crude wax, three ounces of powdered barytes, and one pound of glue to a fifty pound batch of tallow. The baking or hardening process is best accomplished in a gas-heated oven like that shown in Fig. 5. Here is a plan for making a gas-heated oven consisting of a sheet iron box provided with a perforated false bottom. The gas burners are arranged below this false bottom and are supplied with air and gas through the junction pipe. Stop cocks should be fitted to the piping, so as to govern both the air and gas supply, thus controlling the heat. There are racks upon which to place the wheels to be treated. Ventilation is made by having sub-pipes leading into a main pipe, thus assuring perfect ventilation from the sides. The final finish of the wheels is with linseed oil or crude petroleum, a very little being put on at a time and rubbed in thoroughly until the surface looks like a mirror. To counteract the ill effects of the temperature in damp places the wheel face should be rubbed occasionally with equal parts of linseed oil and turpentine applied with a flannel and then rubbed in with a soft cloth. There is no doubt that paper friction wheels will some day be a part of regular business. In the case of a friction wheel which recently came under my care and which had always been lagged with leather about once in three months, a good paper of strong, close-grained pulp stopped all trouble. It has now been running several months, with but little signs of wear. This wheel is 20 inches diameter and runs 2,000 revolutions per minute.

A New French Telephone.

According to La Vie Scientifique, the French Minister of Commerce has been conducting experiments with a new telephone invented by Pierre Germain, an inspector of telegraphs in Paris. In order to secure patent-rights the inventor has withheld all information regarding the mechanical construction of his telephone. From the little that can be gleaned from the first experiments made, it would seem that the telephone was capable of reproducing sounds with greatly increased phonic power, but with a loss in clearness. In the experiments, the receiver having been brought closer to the ear, not a single intelligible word could be heard: but the greater the distance between the receiver and the ear, the clearer was the sound reproduced. The first defect, it is said, has been remedied. When the experiments were made with this instrument, men and women walking in the streets, although more than 100 yards distant from the receiver, would stop and stare, wondering whence came the voice of superhuman power which they heard above the din of the streets. So powerful is this instrument, that, when used in connection with a phonograph, it is capable of emitting audible sound waves to a distance of nearly 2,000 feet.

Wealth of Labrador.

More is being heard now of Labrador, that land to which legends of giants and curiously deformed men are attached, says The Vancouver News Advertiser. During the last two or three years there has been a growing belief that Labrador, that "great and terrible wilderness," that "Helluland," or region of naked rocks, as the old Norseman called it, is destined to turn out a rich mining region. As yet there is no tangible proof of this; but of late it has been explored in many directions, its rivers have been ascended, its tableland crossed at several points, and the result has been that it has attracted much more attention than before, and is no longer regarded as a desolate heap of rocks, use-

Fig. 4.—FINISHING.

less for the purposes of civilized man. Mr. Lowe has told us of its vast forests, and visitors from various lands have brought back so many specimens of minerals that a widespread impression has arisen that it will become a great mining field.

The magic word gold has been whispered in connection with it, and the possibility of a northeastern Klondike being discovered here has taken possession of the minds of no small number of explorers. Its formations are said to resemble those of the real Klondike, and gold specimens have been found which the keen-eyed hunters of that metal regard as peculiarly promising. The result is that no fewer than seven exploring expeditions have made this year for Labrador. Five of those were organized in Halifax, one left from Boston, and the seventh has just started from St. John's.

In another respect Labrador is attracting attention.

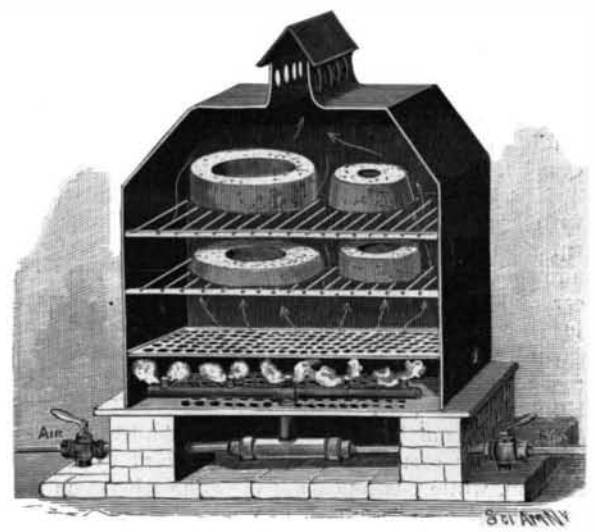

Fig. 5.—DRYING OVEN.

Though the coast is a succession of grim rocks—not without a wild, stern beauty of their own and almost treeless—yet at the heads of some of the bays and inlets there are large areas covered with timber of a large size, mainly spruce, well adapted for lumbering purposes. In these Labrador forests speculation is rife this year. No fewer than twenty-one applications for timber limits, some of them for five hundred square miles, have been made to our government, and the same number of licenses to cut timber have, we understand, been granted, so that a considerable amount of capital is likely to be invested here, and this will furnish increased employment to the people. Labrador hitherto has been famous only for the fish wealth of its seas; now it would seem as if the treasures of the land were to be turned to account. Its dimensions are enormous. The Atlantic coast line is over one thousand miles in length, and the area of the entire peninsula not less than 420,000 square miles.