MACHINE FOR TRIMMING PAPER ON FOUR SIDES.

This new machine, manufactured by Messrs. Lhermite Bros., of Paris, is designed for shaping registers, copy-books, letter paper, etc., and, in general, all articles of paper that are trimmed in large quantities to a given size. Such sizes being rarely square, and nearly always rectangular, and, moreover, the blade having always to remain invariably in the same place, the problem to be solved was the finding of a combination that should permit each side of the rectangle to come alternately in contact with the blade throughout its whole length, and that, too, accurately and automatically. The following description will show by what means the manufacturers have succeeded in finding a satisfactory solution.

The cast iron frame of this machine supports, at its rear, a trimming apparatus, which consists of a cutter-head that moves between two checks affixed to the frame. This cutter-head, which is guided by two rollers and by slanting slides, is connected with a lever which oscillates upon a fixed point, and which is coupled with a connecting rod that is actuated either by hand or power, through the intermedium of a train of gear wheels.

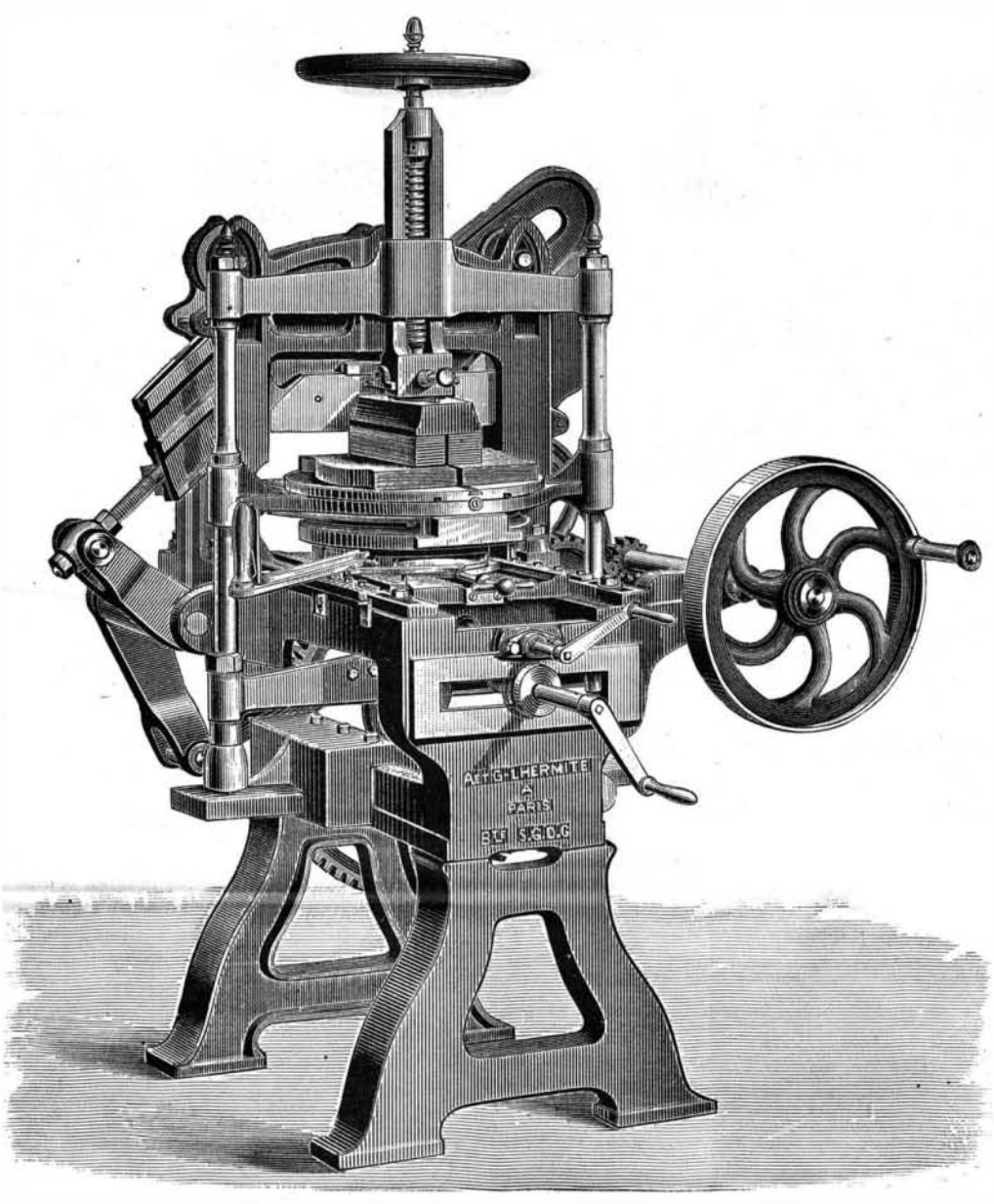
The movable part of the machine consists of two iron uprights, whose lower portion forms a cup and contains a ball that rolls over a support bolted to the frame. These two uprights are connected at their upper part by a cross brace, and at the middle by an annular plate, in whose center is a pivoting disk that is designed to receive the paper. The upper cross piece forms a nut, and carries at its center a screw provided with a hand wheel. The gauge, which is fixed to the lower extremity of the screw, is capable of being given a rotary motion independent of that of the latter, and is held by a bolt that indicates at the moment the paper is pressed whether the gauge block is exactly parallel with the blade.

The lower cross piece carries a collar that is designed to receive the extremity of the rod of the pivoting disk. Around this latter, and beneath the annular plate, there is an iron circle which is made eccentric with respect to the latter by an amount equal to half the difference between the two sides of the gauge block.

For shifting the paper after each cut, a horizontal lever is used which is quite similar to the reversing bar of a locomotive, and which causes the pivoting disk to revolve. In order that the latter shall not make more than a quarter revolution, a click drops into a notch at the precise moment that it should stop. This click is lifted by the lever itself when the latter is pulled back in order to make another quarter revolution. From this arrangement it will be seen that, aside from a rotary motion, the disk that carries the paper, and consequently the entire affair formed of the cross pieces and uprights, has a shifting motion, which is communicated thereto by the lever and eccentric circle.

In front of the machine there are two winches, one of which serves, through the intermedium of beveled gear wheels, to rotate the disk *in situ*, while the other is designed to permit of the approach or recession of the carriage that carries the entire movable part, so as to put one of the faces of the gauge (the eccentricity of the circle having been regulated with regard to the size to be obtained) in contact with the blade. The carriage is afterward fixed to the frame with screws, so as to secure an invariable position for it.

The machine, after it has been regulated, is operated as follows: Two packages of paper are taken and placed back to back (as shown in the figure), and squared up by means of a guide arranged for the purpose. The gauge employed being double the size of one of the packages, it follows that, in *four* cuts, *two* completely trimmed packages are obtained. Moreover, as the disk that carries the paper is so arranged that it can be rendered movable perpendicularly to the blade, and independently of the other motions, it therefore becomes possible, by operating with a gauge quadruple the size that is to be obtained, to cut in two what has been obtained by the first operation, and thus form *four* packages with *five* cuts only. The machine may, when necessary, be employed as an ordinary trimmer, and trim piles of paper as much as one-tenth of a meter in thickness.—*Annales Industrielles.*

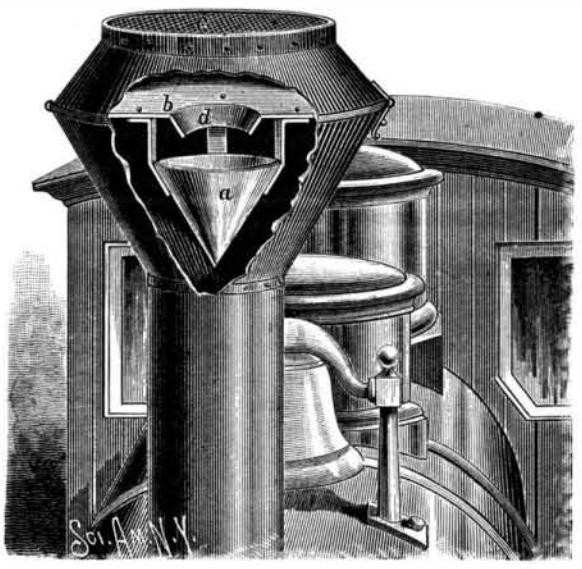


LHERMITE'S MACHINE FOR TRIMMING PAPER.

ABOUT a hundred thousand Canadians are engaged in the lumber business. The total product of lumber in Canada in 1881 was $38,541,752.

SPARK ARRESTER.

An invention recently patented by Mr. John C. Printup, of Rome, Ga., is to prevent sparks from escaping from smoke stacks of locomotives and other engines. The smoke stack has a flaring head, to which is hinged a tapering top secured by a spring catch. To the upper edge is fastened a wire gauze, *c*. A circular sheet iron plate, *b*, having a central circular aperture, is riveted to the upper edge of the head of the smoke stack. An inverted sheet iron cone, *a*,



PRINTUP'S SPARK ARRESTER.

is suspended at a little distance below the plate by brackets. The base of the cone is larger than the aperture, and the cone is of such size that the area of the annular space surrounding it is at least equal to the area of the cylindrical part of the stack, so that the draught will not be obstructed. The sparks that pass up the stack strike against the convex surface of the cone, *a*, are deflected against the outer part of the plate, *b*, and shell of the stack, and fall back to the lower part of the stack, from where they can easily be removed.

New Use for Electricity.

The endless diversity of uses to which electricity may be put received another illustration recently at the Court Opera at Vienna, where, by the simple expedient of suspending tiny incandescent lamps by fine swinging wires, the effect was produced of swarms of fireflies flitting about a tropical forest. By switches the current is turned off and on, and the effect, as the artificial fireflies flash and dance in midair, is said to have been electrical in other than a literal sense.

The Arlberg Tunnel.

The piercing of the mountain was successfully completed, as far as the advanced heading is concerned, on Tuesday, the 13th of November, 1883. The tunnel proved to be three meters shorter than had been calculated, and thus the meeting took place a day sooner than was intended. The *Engineer* says a similar miscalculation in the St. Gothard Tunnel was attributed to the attraction of the mountain. Another great Alpine highway is preliminarily opened up, just two years after the first experimental trip conveyed about sixty passengers—contractors, engineers, and their friends—through the tunnel of the St. Gothard. The new tunnel is 10,270 meters in length, while the Mount Cenis Tunnel is 12,323, and the St. Gothard 14,900 meters. The first took fourteen years and a half, and the second about eight to bore; the Arlberg Tunnel will have taken, when vaulted and ready to receive the first locomotive, about four years. Dynamite has been largely used, and the Brandt revolving rock drill has been employed, as well as the Ferroux percussion drill. For these drills several streams from the heights of the snow-covered Arlberg were gathered on the eastern side into reservoirs, from which turbines which compressed the air to five atmospheres, for the Ferroux borers, were worked; while on the western side pumped water was passed through pipes to the pressure of over a hundred atmospheres, to work the Brandt revolving borer, which cuts cylindrical blocks of rock from the mountain.

The gallery has been driven on a level with the bottom of the future tunnel, and not on the Belgian system, as was formerly done, on a level with the top. Large money premiums were granted for completing the work before the stipulated time—in which premiums the contractors allowed their workmen to share. The two halves of the work were allotted on December 21, 1880, to two contractors—Ceconi for the eastern part, and the Brothers Lapp for the western side; but the piercing of the galleries, effected in the beginning by ordinary tools, as the nature of the stone did not allow the employment of boring machines, had already begun in June, 1880. On November 13 and November 17 respectively, the percussion and the rotating borers began their work, which advanced on each side at an average of from 5 to 7 meters daily, the greatest effort having been achieved in 1882, when 3,590 meters were bored, while the St. Gothard Tunnel had a maximum of boring in 1878 of only 2,530 meters. The whole cost, including the double tracked railway through the tunnel, will not exceed eighteen million florins, or one and a half million pounds, including the premium to the contractors for early completion; while the cost of the whole railway line from Innsbruck, in the Tyrol, to Bludenz, in the Austrian province of Vorarlberg, passing through the Arlberg Tunnel, will be forty million florins. The third Alpine tunnel connects parts of the same country, and not foreign countries, as in the case of its forerunners.

How to Glaze Photographs.

BY E. WIDEMAN.—Take virgin wax, 8 grammes, and of ordinary ether, 100 grammes; shake, and allow them to dissolve. Over each plate to be waxed (take care they are perfectly clean) pour a little of this liquid, 8 or 10 drops, and polish with a pad of linen until all traces of the wax have disappeared. Next dissolve about 40 grammes of white gelatine in 400 of ordinary water in a hot water oven, and filter through a cloth or fine sieve into a porcelain dish. Coat the waxed surface of the plate with normal collodion, of 1 gramme gun-cotton to 50 of ether and 50 of alcohol. When just set, immerse in the warm gelatine bath, while the mounted photograph is also soaked until thoroughly impregnated with gelatine.

Raise the plate with the finger to let it drain, and allow the gelatine to form a solid body with the collodion, and apply the picture to the surface without taking out of the bath. Press the card against the glass, beginning at the top, and inclining them as they are being taken out; with the other hand cause the rest to adhere by lightly rubbing the card down with a fine sponge.

Afterward wipe off the excess of gelatine from the back of the card and reverse of the plate; leave it to dry in a warm place, and in about eight or nine hours cut round the edges, and if it is dry it will come apart directly.

A little experience will suffice to obtain very pretty results, free from bubbles; the gelatine may be colored at will with aniline dyes soluble in water.—*La Nature.*