

MACHINE FOR BREAKING FABRICS.

As well known, the object of breaking fabrics is to part the threads of the warp and woof which are held together by the finishing materials employed (starch, dextrine, gelatine, etc.), so as to make the goods soft and pliable.

The accompanying cut represents a new machine for the purpose invented by M. Garnier, and improved by Messrs. Pierron and Dehaitre.

All the parts of the apparatus are supported upon two parallel frames properly connected by crosspieces. In front there are two superposed rollers, one of which receives the fabric to be treated, while the other takes the latter up after it has been submitted to the action of breaking during its travel. The first roller is set in motion directly by the driving gear; and to the second there is attached a brake, by means of which the resistance of the fabric and proper amount of tension to give may be regulated at will. There is also an ingenious arrangement which allows of one or the other of the two rollers being actuated alternately, so as to make it easy to direct the piece successively from one cylinder to the other in order to submit it in each case to the parts of the machine.

The driving mechanism consists of a toothed wheel keyed upon the pulley shaft, and connected with a lever that carries a second wheel mounted loose on its axle, and gearing constantly with the first. On moving this lever, the teeth of the loose wheel are made to engage with the teeth of a third gearing fixed on the axle of the roller that it is desired to set in motion. When the lever is fixed in its medium position, the gearings of the two rollers are neither of them in contact with the middle wheel, and motion ceases.

pliable, while still preserving the finish that gives it the necessary body.

On leaving the breaking cylinders the fabric passes over stretching cones which have their apices in the axis of the machine and their buses turned toward the frame of the latter. These cones are designed for stretching the goods breadthwise, so as to prevent folds while being rolled up. Each of the large cylinders has a corresponding cone, on to which the fabric is directed by means of small movable cylinders that may be displaced by a hand-lever belonging to one of the S-shaped supports shown in the cut.

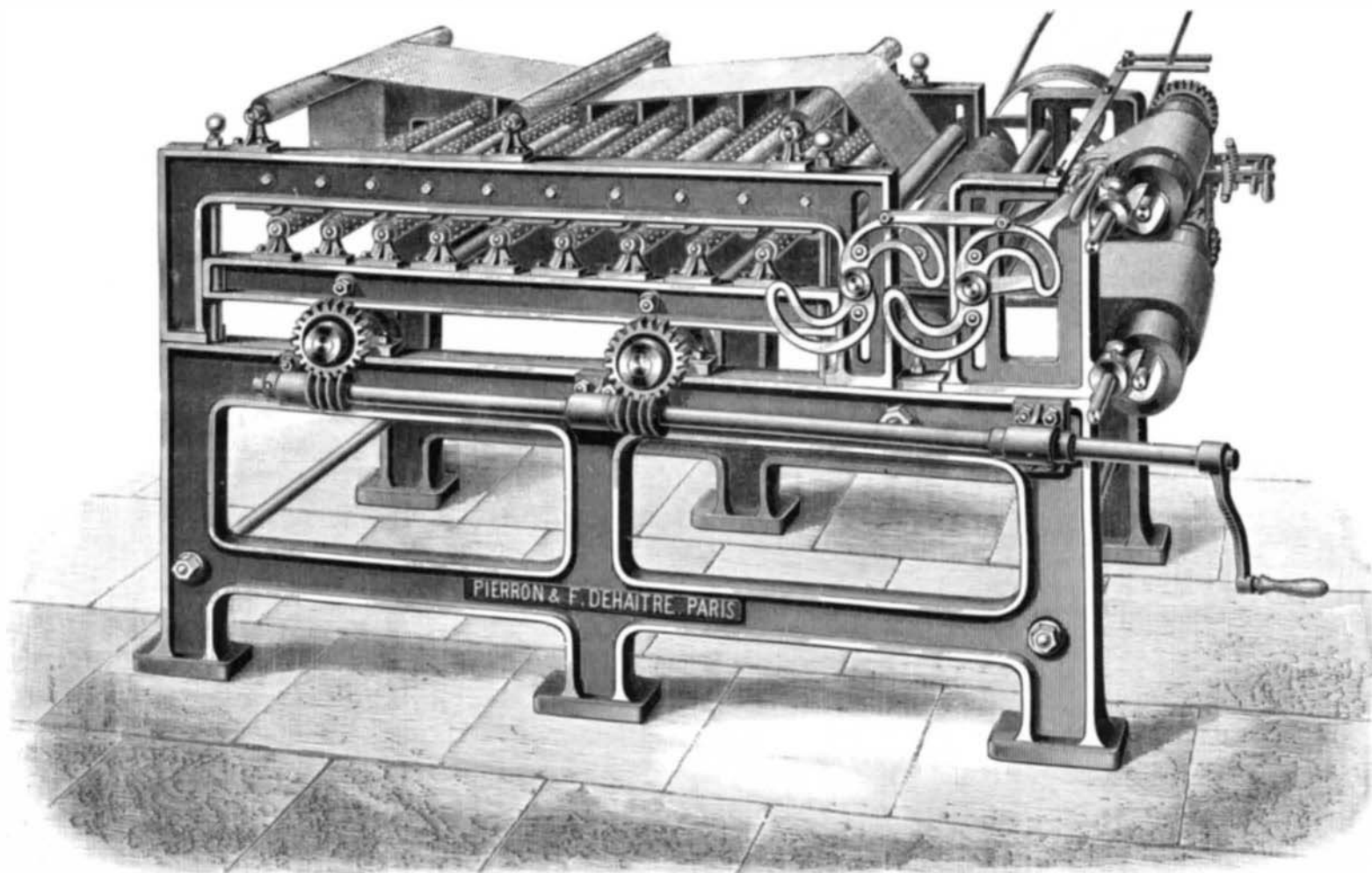
When the piece has been completely wound up on one cylinder, it is made to return upon the other by changing the position of the lever that carries the intermediate gearing of the driving mechanism, and by modifying the effect of the brake. The cylinders revolve in opposite directions, and the breaking continues as has been described.

For the treatment of light fabrics, two operations may suffice, but, by reason of the rapidity with which the work is executed, it is preferable to increase the tension progressively, and to cause the piece to pass over the breaking cylinders several times. In this way the desired degree of softness may be obtained without uselessly stretching the goods. This machine, employed for the treatment of Lyons fabrics, has given good results. The manufacturers propose to apply it likewise in the treatment of woolen fabrics as well as those of woolen and cotton; for, up to the present time, the apparatus that have been used for such a purpose (calendering machines, etc.) succeed in breaking fabrics only by making them thinner.—*Revue Industrielle*.

ing. The answer being heard at Guaymas, the two chief executive officers of the longest continuous line of railway in the world under one management talked with each other, receiving and sending congratulatory messages over the completion of the road, one with the Atlantic Ocean at his feet, and the other on a shore washed by the Pacific, 3,500 miles away. At stations between the two points, in States and Territories through which the wire passed, operators listened at the instruments for the first sound, and when at last the circuit was in good working order, all that was being said was heard at different points as the sound passed over the wires. The feat was one which operators from one end of the country to the other watched with interest, and, at the conclusion of the five hours' test, they might truly have said, one to another, "What hath God wrought?"

Rapid Formation of Ore Veins.

It appears from a recent observation by Dr. Fleitmann, of Iserlohn, known to our readers as the inventor of a process for welding nickel, that the formation of ore veins need not necessarily occupy such long periods of time as we are generally inclined to accord to it. Dr. Fleitmann gave his experience as follows: Some two years ago he had the bottom of a stable pit filled and rammed with common clay containing iron. The pit had served its purpose for storing dung for about two years, during which time, occasionally, to prevent overheating, water had been poured over it; lately it became necessary to remove the pit, when, to the great surprise of Dr. Fleitmann, he found the clay had entirely changed in character, and had become white; it was, moreover, divided in numerous directions by fissures from one twenty-fifth inch

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The fabric on unrolling passes over the breaking cylinders that constitute the principal feature of the machine. These are made of wood, and are provided with iron journals. Their external surface is studded, according to lines determined by practice, with oval-headed and perfectly polished nails like those used by upholsterers for trimming furniture. Ten of these rollers, placed between the upper parts of the frame, have fixed axles, around which they revolve. Another series of ten rollers, exactly like the others, are mounted on a horizontal frame which is capable of being raised or lowered by means of four interior eccentrics. This frame is held and guided vertically by rods inserted into the uprights of the machine frame. It rests on the eccentrics, and the motion of the latter is effected through the intermediate of two endless screws keyed upon a single longitudinal shaft. Upon actuating the winch figured to the right in the cut, the ten rollers of the movable frame enter between those that are mounted on the machine frame, so that both sets are ranged in the same plane.

As a consequence of this maneuver, the fabric which was passing freely between the breaking cylinders is forced to assume an undulatory form, and come in contact with the round and polished heads of the nails with which the cylinders are studded. As the oval projections do not present themselves at the same places, the fabric is both stretched over these and forced into the hollows between them during its travel between the twenty cylinders. It is at this moment that is effected the continuous and regular breaking over the whole surface exposed. The threads of the warp and woof are thus parted, and, at the same time, the fabric becomes

Conversation Carried Three Thousand Five Hundred Miles.

A wonderful feat, even for this age of wonderful things, was performed over the line of the Western Union Telegraph Company a few days ago, says the *Kansas City Journal*, at which time President W. B. Strong, of the Atchison, Topeka & Santa Fé Railway, talked by telegraph from Boston with C. C. Wheeler, general manager of the company at Guaymas, on the Gulf of California, a distance of about 3,500 miles. The circuit, it is claimed by telegraph experts, was one of the longest ever undertaken in America during daylight, and was from Boston to Chicago, thence to Kansas City and Pueblo, Col., from which point the wire ran south to ancient Santa Fé, N. M., the home of the fire worshipping Pueblos, and then to Benson, in the southern portion of Arizona. At Benson the wire led south across the line into old Mexico, through Sonora to Guaymas, on the Gulf of California, where some day a line of rail will also connect with Chihuahua. At Guaymas, General Manager Wheeler and party, who a few hours before had driven a silver spike into a mahogany tie, completing the line of the Santa Fe road from Kansas City to the Pacific Ocean, were in waiting, and about 12 o'clock by Pacific coast time the announcement was made that Boston was "O. K."

"Tick-tick-tick-tick," clicked the little instrument beneath the telegrapher's hand at Guaymas; "tick-tick-tick-tick," though very faintly, spoke the instrument as the sound passed through the Kansas City office, and the same instant it was heard in Boston. In less than five seconds came the reply from Boston, where President Strong was in wait-

to one-sixth inch in width, which were filled by compact iron pyrites. The explanation Dr. Fleitmann gives is, that the iron oxide of the clay was changed, by the water containing sulphate of ammonia, into sulphate of iron, and the latter had, in accordance with molecular attraction, deposited itself in groups of fissures.

Lightning and Rods.

An interesting note on the efficacious protection of a house by a lightning protector, during a recent storm at Colmar, has been brought before the French Academy of Sciences by M. G. A. Hirn. The conductor was by no means a good one, and terminated in a piece of iron lying in a water cistern or trough standing in the corner of a court. In spite of a terrific thunderstorm which struck the rod, no part of the current left the rod, but all was discharged into the earth. The brass point was, however, fused. Experiments by M. Hirn fully confirm the views of M. Melsen that lightning rods should end in metal masses, such as pipes, and not in so poor a conductor as water. When there is a flaming discharge seen at the point of a lightning rod, it is a proof that the rod is not a good one, for M. Hirn has proved that these rods act busily during a thunderstorm in giving off a silent discharge. By means of an electro-magnet in a derived circuit from the rod, he has demonstrated this fact. When the storm passes the zenith, the bars become magnetized. The same effect is shown by connecting a galvanometer in the circuit of the rod; and we may mention here, says *Engineering*, that a plan was recently patented for charging secondary batteries in this way.