

An improved method of embroidering and apparatus therefor has been patented by Mr. Joseph Halter, of Rebsstein, Switzerland. The object of this invention is to make different kinds of lace, guipures, and other varieties of machine embroidery that can be made on ordinary embroidery machines with cotton, flax, wool, silk, or other thread upon a ground of paper or other material that can be easily washed away or removed when the lace or other open work is completed; also to provide apparatus to support the paper when it would by itself be torn by the embroidery needles and thread; and to connect the embroidery figures by strong thread passed through each figure, so that they are suspended to each other; and to wash away or remove the paper or other easily destructible ground on which the embroidery has been made.

A new apparatus for facilitating adding numbers, and to enable persons not acquainted with the addition table to add numbers, has been patented by Messrs. David M. Fulwiler and James A. Fulwiler, of Lexington, Ill. The invention consists in a board divided into longitudinal columns, each provided with an index letter and containing rows of numbers, the board sliding in a frame attached to a base, and provided with a transverse rule or strip above the board, and having subdivisions corresponding with and indexed the same as the columns on the board, with which they coincide, this frame being also provided with a longitudinal casing at one end, containing a slide with numerals on the upper surface, showing through a slot in this casing, and with ratchet teeth on the lower side, in which teeth a spring pawl in the sliding board catches.

An improved basket for gathering or holding cotton has been patented by Mr. George W. Starr, of Vicksburg, Miss. This basket can be folded very compactly, so as to occupy very little space while being transported or stored. It is formed of an upper metal ring with loops, in which rods are pivoted, having their lower ends bent over, so that they will catch under the bottom, which is attached to the sides, made of canvas.

An improved device for holding drawers in such a manner that they will not be inconvenient to the wearer, and can be fastened or unfastened easily and quickly, has been patented by Mr. William W. Beach, of New York city, assignor to himself and Charles V. Goddard, of same place.

An improved wagon has been patented by Mr. Silas Van Patten, of Duanesburg, N. Y. This wagon is constructed in such a manner that it can be loaded and unloaded by the action of the team while attached to the wagon.

#### FAILURE OF MATS AS A PROTECTION TO THE RIVER FRONT OF NEW ORLEANS.—SOMETHING NEW WANTED.

The board of engineer officers appointed last fall to examine the work in progress for the protection of the river front of New Orleans have reported against the continuance of the present plan of operation. This work, it will be remembered, has been going on for several years to stop the more or less rapid erosion of the river front of the city, by carpeting the slope of the river bed with mats of brush and cane.

The course of the Mississippi at New Orleans is such as to throw its powerful current directly against certain portions of its bank. Issuing from the straight reach above Nine Mile Point, it makes a sharp bend to the right at Carrollton, then gradually curves to the left to the foot of Canal street, and then makes another sharp bend to the right, after which it follows a nearly straight line until beyond the city limits. The width at Carrollton is about 2,250 feet, and the channel depth about 140 feet, and these dimensions remain nearly uniform to about the middle of the gentle leftward curvature, when the width is gradually reduced and the depth increased. The former finally becomes about 1,900 feet and the latter reaches a maximum of over 200 feet, and it is in this shape that the river enters the sharp bend below Canal street, called in New Orleans the third district. The entire Mississippi River, concentrated to a degree nowhere else to be found along its course, and possessing therefore its maximum power of excavation, is here turned about an angle of 90° upon a radius of about 3,000 feet. The concave bank—meaning by that term the entire slope from the top to the bottom of the river—which can resist such a force for even a brief period must possess great stability. Rapid excavations and deep incursions are to be expected.

It was ascertained by the Board of Engineers convened by the Mayor of New Orleans, in 1877, that the bank at Carrollton Bend had receded about 500 feet in twenty years. While this has resulted in the loss of considerable valuable property and should be checked, the locality is of altogether secondary importance when compared with the third district. At the latter place vast commercial interests are concentrated; the bank is crowded with wharves, and every inch of the adjoining ground has a value. Here the bank is practically where it has been for a century and a half, or rather there has been no recession. At the extreme upper end of the bend, in the immediate vicinity of Canal street, there have been large accretions, several blocks of the city having been added and built upon outside of what was formerly the shore line. This is due to the natural movement of the bend down stream. In the bend itself considerable batture formations have occurred at intervals and then disappeared. This cannot be accounted for without a knowledge of the various obstacles, such as wharves, wrecks, etc., that may have been placed in the river at various periods—information not now attainable.

The explanation of the fact that the main bank as a whole

maintains its position is found in the multitude of wrecked wharves and bulkheads which here line the river front. There is no record of how many wharves and bulkheads have gone in at any one place, but the number is known to be large. In some cases a wharf has lasted but a single year. Divers report that the remains of these structures are to be found all the way to the bottom of the river.

The piles, beams, and planks, though more or less held together, are twisted into irregular shapes, making excellent silt-catching devices. But this is a very expensive protection; and the repeated destruction of the wharves has rendered high wharf rates a necessity, so that the entire commerce of the port is interested in having the evil removed.

The plan proposed in 1878 was to cover the upper section of the river slope at Carrollton with a layer of brush ballasted with stone. For the section from Morgan's Wharf to the foot of Congress street, including the sharp bend below Canal street, it was proposed to form a bulkhead in line with the outer row of wharf piles, by driving piles in pairs three feet apart, the distance between the pairs to be six feet; these piles to be bolted together at low water and at the top, and a wall of brush fascines set up between the piles, up and down stream, to low water mark; the rest of the space to high water to be planked. From the foot of the row of piles it was planned to lay upon the slope mats of brush ballasted with stone as far out as might be necessary to cover all defective strata.

Operations have been carried on during the low water seasons of 1878, 1879, 1880, and 1881, the work for the first three years being confined to the third district, while the greater portion of the work done the next year was in Carrollton Bend. The following method of construction was adopted for the former district:

The mat was first made in small sections, 24 feet by 25 feet, the material used being cane. In the finished section the canes lay in a single layer, side by side, with sufficient interval between them to allow for the stitching, say one inch. It was sewed from one end to the other by seven continuous pairs of wires or pieces of marline, the latter being used to the exclusion of wire after the first few mats were placed. The stitch was the shoemaker's stitch; that is, one marline passing under one cane, passed over the next, under the third, over the fourth, and so on, while the other marline of the same pair alternated in the same manner, but passing on the opposite sides of the canes. The marlines thus crossed each other at each interval between the canes. In crossing they were not caught together. They were secured only to the middle and end canes of the section. The breaking of a marline at one point destroyed its efficiency throughout its length. An opening was made in each joint of each cane to destroy its buoyancy and admit sediment from the river after sinking. Eight of these small sections were sewed together end to end, making a mat 200 feet by 24 feet, and it was in this shape that the mats were put down during the seasons of 1878 and 1879. For placing them a row of guide piles 6 feet apart were driven upon the line of the front wharf piles. These were heavy piles of pine 65 feet long, and were intended to subsequently form part of the brush wall described in the plan. An iron ring was slipped over each pile, fitting loosely, to which the end of the mat, the 24 foot side, was secured by a piece of light rope. The barge upon which the mat was spread was then moved out into the stream by a tug boat, the mat was launched and placed upon the bottom, with its longer side as nearly as possible perpendicular to the shore. The ballast used with the first few mats was old boiler tubes, and afterward sand bags. Buoys were attached to each mat before sinking, by means of which its location upon the bottom could afterward be approximately ascertained.

Care was taken to sink a new mat at any place which seemed to have been left uncovered, but notwithstanding this precaution, it is probable that some portions of the slope within a distance of 200 feet were left uncovered. The presence of ships at the wharves was a serious inconvenience to the work, causing frequent interruptions. It could not be made continuous. The work done in 1878 and 1879 was begun just below Picayune Pier and extended to the foot of Mandeville street, covering a length of 1,116 feet measured along the bank. It consisted entirely of matting of the above description, nothing being done toward the brush wall except the piling.

In resuming operations in 1880 it was found impossible to begin at Mandeville street, where the work of 1879 terminated, because of the number of ships moored below, as many as twenty sometimes lying between Mandeville and Montegut streets. These the wharf master refused to move. Work was accordingly begun at Montegut street, leaving a gap of 2,262 feet between that and the work of 1879. The general construction of the mats was the same as before, except that they were made larger. Forty sections, each 14 feet by 25 feet, were sewn together, making a mat 200 feet by 70 feet, instead of 200 feet by 24 feet, as before. Floating ways, having the direction of their slope parallel to the shore instead of perpendicular to it, as before, were moored to the guide piles. The mat, being secured to the latter in the same manner as before, was launched up and down stream instead of across stream, as before. Ten such mats, covering a length of 560½ feet of bank between Montegut and Louisa streets, were laid in 1880.

The ballast used was sand bags. Very little work was done at this place last season.

The wharves in front of which the work of 1878 and 1879 was done fell into the river in 1880. They were rebuilt and

were wrecked again in 1881. The wharves in front of which the work of 1880 was done were destroyed in 1881.

The decision of the board of engineers is that the plan of improvement as executed, so far at least as the third district is concerned, is a failure.

"The impossibility of doing continuous work, and the flimsy character of the matting put down, would perhaps account for this. Under any plan a remedy for the first evil consists in withdrawing the portion of the river front under improvement from wharf service while the work is going on, and this requires the co-operation of the city authorities. The cane is not, in the opinion of the board, a good material for the protection of the banks of the Mississippi. Its straightness and smoothness deprive it, to a large degree, of the silt-catching quality which is of so great importance in the revetment of the banks of this river. A mattress made of cane receives little if any re-enforcement from the deposits of the river. If this material be used the mattress should be fabricated with great care, all its fastenings should be made substantial, and if it be found impracticable by any disposition of the material to procure an artificial roughness, it should be prepared to resist by its own strength all the forces which may be brought to bear against it. This has not been done, and in the opinion of the board the mats, as constructed, do not form a protection as efficient as the one contemplated in the plan.

"While the method of construction has been defective, and the circumstances of carrying on the work have been singularly difficult, it is the opinion of the board that no better results would have been attained in the third district if both these causes of failure had been wanting. The problem here seems to be one of wharf protection rather than of bank protection, though the latter question appears in the background.

"The root of the principal evil—the repeated destruction of the wharves—seems to lie in the construction of the wharves themselves. The bearing piles, fender piles, and mooring piles alone obstruct the flow of the water and cause deposits. When to these are added the remains of old wharves, old broken and settled piles, and old bulkheads, a collection of obstacles is found near the top of the bank which, for efficiency in causing silt deposits, could hardly be excelled if designed for that purpose. Heavy deposits are made among them and between the wharves during the higher stages of the river when it is charged with sediment. This mass of soft material acquires in time a bulk and weight which the steep slope below cannot support, even while it remains submerged. When the river falls the new deposits are often uncovered, and the tendency to rupture is increased by the withdrawal of the support furnished by the water. The difficulty is aggravated by the presence of vessels.

"Vessels lying at the ends of the wharves deflect the current downward toward the bottom, and while preventing deposits at that place cause a scour upon the material below. The deeper the draught of the vessel the deeper will this action extend. A vessel drawing 25 feet will, if left long enough at one spot in a rapid current, deepen the water by an amount nearly equal to its draught. Here are all the conditions necessary to explain the various phenomena which accompany the destruction of the wharves. The slope of the bank being too steep to bear the great additional weight at the top of it yields, and may yield in a variety of ways. The new material may slide out, carrying the upper parts of the piles with it, and leaving the toes undisturbed; in this case the piles will be inclined outward. Or it may settle down vertically, pushing out a layer of similar material from beneath it. If the latter layer is within the range of the piles it will carry their toes out, and in this case the piles will be inclined inward; if it is beyond the range of the piles they will simply sink and not be inclined either way. In the disintegration attending these disruptions a crack may be formed into which a pile will sink of its own weight, and, tearing loose from its cap, will settle down with greater rapidity than the balance of the wharf. A combination of the two movements above described, or unequal loading of the wharf, or an eddy about its extremity, or the unequal stability of different portions of the soil underlying the fresh deposits, will account for the irregularities which sometimes appear in the wreck of a single wharf. The yielding of the bank may occur at any stage of water, though it is most usual immediately after the fall from a high stage, and is rare immediately after a prolonged low stage. The increased draught of the sea-going ships now visiting New Orleans would cause more rapid wrecking of their wharves than formerly. While the presence of vessels at the ends of the wharves aids and hastens their destruction, it is, as before stated, not essential to it.

"How far down this sloughing of the bank extends is not now known, and it can be ascertained only by careful and prolonged observation. It would seem probable that the depth is not great, not exceeding perhaps a depth of 40 or 50 feet. But whatever the depth, a preliminary to any efficient protection must be the removal of the primary cause of the sloughing, viz., the overloading of the top of the bank by silt deposits. The brush wall proposed in the plan under discussion would have the contrary effect. It would increase the amount of this overloading and would aggravate the evil.

"The board is, therefore, forced to the conclusion that the present plan of improvement, whether viewed in outline, as to its general merits, or in detail, as to its method of execution, should not be continued."

The board does not offer any substitute for the plan of operation which it condemns.