### Photo Printing by Machinery.

Regarding the new method of printing by machinery, invented by Mr. John Urie, of Glasgow, having seen the machine at work, we are in a position to give such an account of it as will enable our readers to understand its action.

Externally the machine consists of a long box of about the dimensions of a foot and a half square, and of three times that length. In a recess in the center is fixed a pad, over which a long band of Alpha paper passes, as it is being unwound from a spool at one side upon a drum at the other. Surmounting this pad is a heavy metal frame containing the negative, this being hinged at one side so as to admit of its being raised when it is necessary to move the paper underneath; and above this in turn are two gas burners. Certain clockwork in the interior is actuated by two weights as the motive power.

The time of exposure is regulated by the adjusting of a barrel or drum containing spikes inserted in its periphery, and by which the duration may either be five seconds, three minutes, or anything between. To prevent the heating of the negative by the gas flames that are so near, a glass bottomed trough of water is interposed.

When we saw it in action, the following movements took place: The clockwork, when started, turned down the gas to a very low point, raised the weighty frame, in which the negative was fixed, to a height sufficient to enable the sensitive paper on the spool to be pulled forward a distance equaling the width of the negative, which was no sooner effected than the negative was immediately lowered again upon the paper, with which it remained in that close contact insured by the weight of its frame. Simultaneous with this movement the gas flames were turned up to their full power, and remained so during the period previously determined upon as that necessary for impressing the image on the paper, the whirr of the machinery being heard all the time. At the expiry of this predetermined period down went the gas, the negative being then raised and the paper drawn forward the requisite distance, when the negative resumed its place on the paper, the lights being turned up, and the whole process of exposure re-enacted.

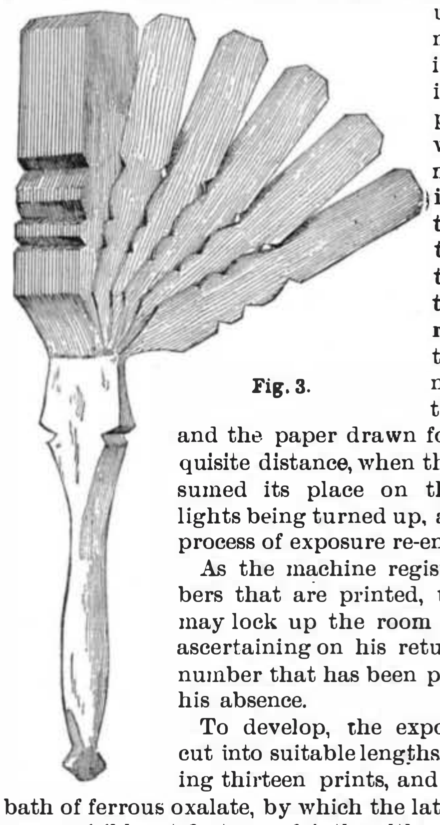
Fig. 3.

As the machine registers the numbers that are printed, the attendant may lock up the room and go away, ascertaining on his return the precise number that has been printed during his absence.

To develop, the exposed paper is cut into suitable lengths, each containing thirteen prints, and is placed in a bath of ferrous oxalate, by which the latent image becomes visible, at first very faintly, although it soon acquires great vigor. The band of prints having been washed is then transferred to a bath containing alum solution, in which it remains ten minutes. It is then placed in a gold toning bath, where it acquires any color desired. This tone may be determined with accuracy, as the prints undergo scarcely any change at all when, subsequently, they are fixed by hyposulphite of soda. It will be understood that one print is identical with another in vigor and tone, and that these qualities are quite under the control of the operator. As many as two hundred *cartes* or cabinets may easily be printed in an hour by one machine.

As regards quality of print, it is all that need be desired.—*Photo. Times.*

### Best Plant for Holding Banks.

The best plant at present known for consolidating, by the interlacing of its roots, the loose soil of a newly made embankment is, according to M. Cambier (of the French Railway Service), the double poppy. While the usual grasses and clovers need several months for the development of their comparatively feeble roots, the double poppy germinates in a few days, and in two weeks grows enough to give some protection to the slope, while at the end of three or four months the roots, which are ten or twelve inches long, are found to have interlaced so as to retain the earth far more firmly than those of any grass or grain.

Though the plant is an annual, it sows itself after the first year, and with a little care the bank is always in good condition.

### WHITTLED FANS.

If you had been passing a certain bustling and smoke-begrimed railroad depot, in a city not far from our great metropolis, during the pleasant summer days, you would have noticed an industrious blind man whittling away at a piece of wood which, when he had laid his knife aside, he dexterously twisted into a fan, much to the delight of the numerous small boys and other passers-by who were attracted by his peculiar occupation.

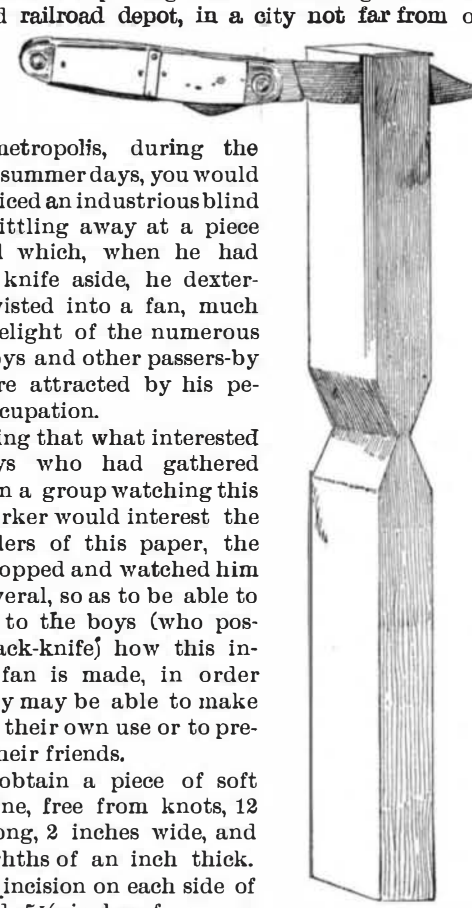
Fig. 1.

Thinking that what interested the boys who had gathered around in a group watching this blind worker would interest the boy readers of this paper, the writer stopped and watched him make several, so as to be able to describe to the boys (who possess a jack-knife) how this ingenious fan is made, in order that they may be able to make them for their own use or to present to their friends.

First, obtain a piece of soft white pine, free from knots, 12 inches long, 2 inches wide, and seven-eighths of an inch thick. Make an incision on each side of the wood 5½ inches from one end to the center of the incisions, and leave the wood a quarter of an inch thick between them (Fig. 1). Now split the shorter end of the wood downward (see knife in Fig. 1), as far as the two incisions, into sections one-sixteenth of an inch thick. Twenty-four parts or blades are needed to make a well proportioned fan. Cut off the surplus ones, half from each side, before making the handle.

The longer part of the wood is thinned down into a handle, any shape the maker desires (see Fig. 2). Now make three more incisions on the same flat sides as the first were made, beginning three-quarters of an inch above the handle. These incisions should be about a quarter of an inch deep, three-eighths wide, with a quarter of an inch of the flat surface left between each incision (Fig. 2).

Before bending the blades into shape the wood must be thoroughly soaked in water, or they will snap off while being bent.

When the wood is well saturated, begin to bend the blades on one side (as shown in Fig. 3) until the center is reached. Overlap the shoulder (made by the top incision) on the left side of each blade with the right of each succeeding blade. When one-half of the blades are in position, turn the fan to the other side and bend them in the same way. This will complete the fan (as shown in Fig. 4). V. S.

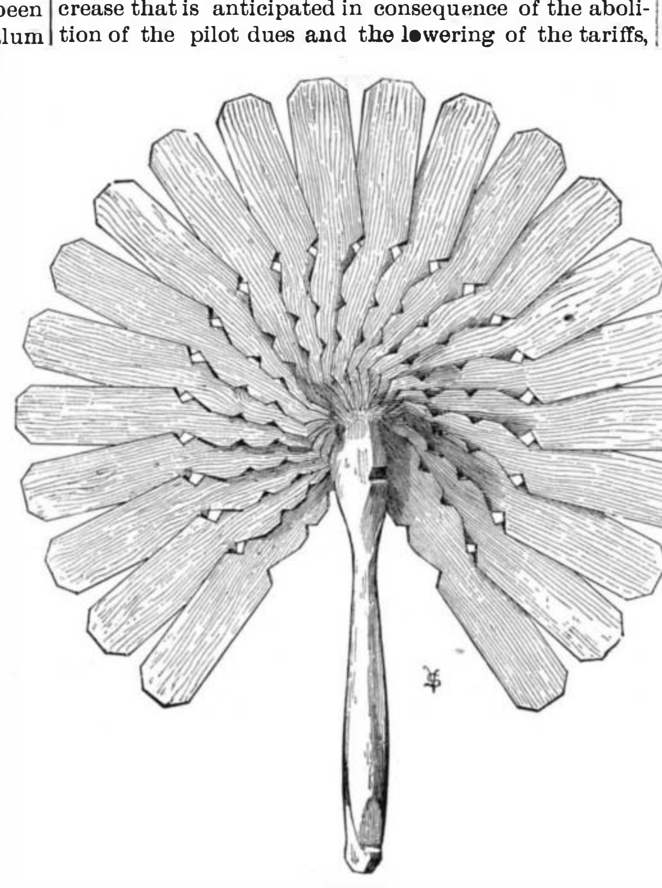
Fig. 4.

### Navigating the Suez Canal by the Electric Light.

In presence of the continued increase in the traffic through the Suez Canal, even during the present commercial crisis, and to provide for the still greater increase that is anticipated in consequence of the abolition of the pilot dues and the lowering of the tariffs, by which merchandise now reaching Europe from the East and from Australia by the route round the Cape will be able to be sent through the Canal, the company has for the last two years been making experiments with electric lights, with a view to enable vessels to continue their passage through the canal during the night. These experiments (says the Paris correspondent of the London *Standard*) have at length proved so successful that it has been resolved to permit from the 1st of January next all vessels of war and postal steamers provided with the requisite electric lights to navigate by night that portion of the canal comprised between Port Said and kilometer fifty-four. Therefore, in almost half that portion of the canal where ships have to put into sidings to allow other vessels to pass them—in the Bitter Lakes vessels pass each other without stopping—vessels of war and mail boats, that together represent 22 per cent of the total traffic, will be able to continue their passage at all times of the day and night. This will constitute a great saving of time, and M. De Lesseps in his circular expresses the confident hope that the trial will be so successful as to enable him to authorize within a short time night navigation for all descriptions of vessels through the whole length of the canal.

### Torpedo Experiments.

The London *Times* gives particulars of some important experiments carried out recently on the torpedo ground outside Portsmouth Harbor, in the Solent. Within the area of the torpedo field situated opposite the sea fronts of Forts Monckton and Gilkicker, near Portsmouth, an important experiment in submarine mining was carried out recently by Captain Markham and Commander Robinson, of the Vernon, on the part of the Royal Navy, and by Major Bucknill and Captain Wrottesley, on the part of the Royal Engineers. At each corner of a quadrilateral was sunk a heavy mine, consisting of 500 pounds of gun-cotton, inclosed in wrought iron cylinders, all four being in separate electrical connection with a battery on shore. The distances of the mines apart were the same as is usually observed in the navy as being within effective destructive range.

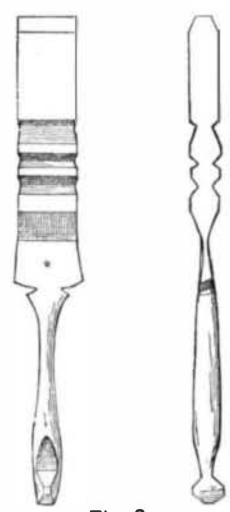
Fig. 2.

At various known distances from the charged mines were submerged a great number of cases of various construction loaded down with dummy gun-cotton as target mines, and the object of the experiment was to ascertain the effect upon the different structures of exploding heavily charged submarine mines in their neighborhood. Twelve of the targets consisted of simple Royal Engineer mines, lined with plaster of Paris and cement, also of electro-contact mines. The targets also included naval countermines, fixed mines, and electro-contact mines, service and experimental. Among others were samples of the ingenious mechanical fixed torpedo invented by Lieutenant Ottley, late of the Vernon, which sinks to a predetermined depth on being thrown overboard, and a solitary example of the mines which were manufactured in England for the use of the Chinese Government on the commencement of hostilities with France. This differs from the service pattern in form and material, being constructed of cast iron instead of wrought iron, and semicircular or umbrella-shaped in section, instead of cylindrical or spherical.

The various mines were all fixed buoyantly, and were destitute of blowing-up charges, as the purpose in view was not to discover whether the explosion of the heavy mines would detonate those in their midst, but to learn the comparative effects of the concussion on the containing vessels and gear, the force of the explosive at different ranges being measured by crusher gauges. Such heavy charges of gun-cotton, amounting in the aggregate to 2,000 pounds, and having an energy equal to about 8,000 pounds of gunpowder, had not previously been simultaneously discharged at Portsmouth. The charges were simultaneously exploded at a quarter past 12 on a half-ebb tide. As a spectacle the effect was somewhat disappointing. The spouts of water were almost connected, and were extremely jagged in outline, but they did not rise to the height expected, the stream of mud which overflowed the interior lining of the jets showing that the mines were scarcely buoyant at the time of the explosion. The detonation was not unpleasant on shore, but the radial extension of the disturbance must have been effective, as fish were stunned at considerable distances out to sea. The results of the experiment cannot yet be known, but it is believed that the Chinese mine is broken up.