Science and Art.

New Propeller for Canals.

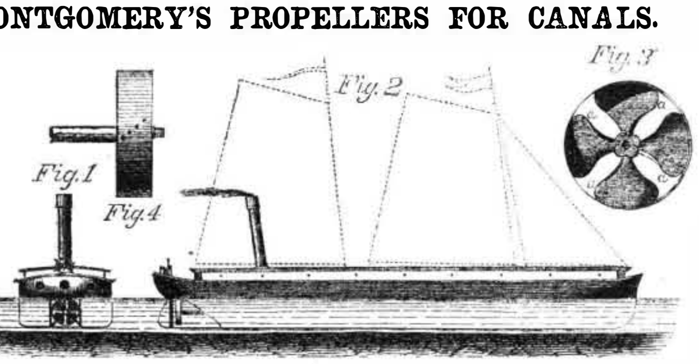
The continual annoyance and great expense attending the use of animal power on canals in the transportation of freight, together with the low rate of speed thus obtained, have led to many attempts to employ steam as a superior and more economical substitute. On canals of very moderate depth (such as the New York and Erie), these experiments, we understand, have not led to such favorable results as many persons anticipated. We therefore feel assured that the importance of the subject will secure a candid examination of any improvement or plan which has for its object the removal of any difficulties which stand in the way of entire success in this system of public transport. In proceeding with this description, the obstacles to full success in canal navigation will be first pointed out. The first is, improperly modeled boats, which have caused too great a swell in the water, even at comparatively low speeds; a second is, the great bulk, weight, and expense for boilers and machinery, and fuel to run them; a third is, injury to the banks of the canal by the waves, when a high speed has been attempted; fourth, frequent breakage of the exposed propeller blades by striking against the banks, and other objects, also by becoming entangled with tow lines. These difficulties are designed to be removed by Montgomery's "Archimedean Steam Canal-boat," represented by the accompanying figures, embracing an end view (Fig. 1) of the boat, a side view, Fig. 2, and a transverse and edge view of the propeller, Figs. 3 and 4. The boiler represented and described on page 129, present volume of the Scientific American, is used on this vessel, but does not require to be further alluded to here.

By reference to the engravings it will be observed that the propeller has four blades, *a a*, but any number may be used. These have the form of portions of exact screws or helices, and they are surrounded with a cylindrical case, to which they are secured. This case increases the strength of the propeller to such a degree that a considerable reduction of its weight in comparison with the common propeller may be effected. It also secures the blades from striking objects and becoming entangled, thereby protecting it from breakage. It also makes the water leave the blades in a direction parallel to the shaft instead of being thrown off violently at the sides, and it is believed that a considerable saving of the power is thereby attained.

The model of the boat is peculiar, and the stem and bottom are bifurcated. The stem is what may be called "swallow-tailed," having an opening beneath equal in hight and breadth to the propeller, which rotates freely within it, and which is thus secured from collision or contact with objects. This opening continues forward, equal in breadth, but diminishing in depth, until it meets the flat bottom of the boat at the *stem* forward.

As in passing through the canal the boat must displace a certain quantity of water, the swell or wave which is generated thereby instead of moving along the sides, and injuring the banks, is intended to pass beneath the boat into the channel or space described, and flow to the propeller in one unbroken current instead of two, as usual—one at each side. By this means it is believed that the screw will have a more undisturbed medium to act upon, and thereby operate more effectiv.ly. There are also two rudders on this boat (one at each side of the propeller opening), both managed with the one steering wheel, and always parallel to each other, to steer the boat in a more perfect manner, and also serve to deflect the current passing from the propeller, so as to assist in directing the vessel also. These remarks are sufficient to point out the original character of these inventions, and the objects they are designed to accomplish. The figures represent a boat embracing all the improvements mentioned, as adapted to the enlarged Erie Canal. It is on a scale for one 95 feet long, $17\frac{1}{2}$ feet wide, and drawing six feet of water. The space required for machinery, boilers, &c., is about equal to that used for horses on those boats which carry their own teams. A pamphlet has been issued on the subject, in which it is stated that about two tuns of coal only are required to be put in as fuel, for a trip. Mr. Montgomery's boat is also designed for the lakes and rivers as well as for canals, so as to run through at a good speed without reshipment of cargo, from the time it is put on board on the upper lakes until it arrives at New York.

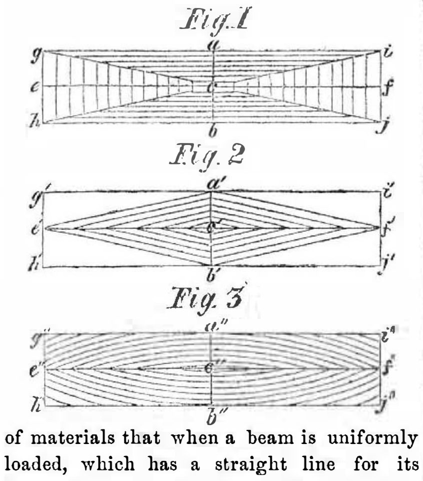
MONTGOMERY'S PROPELLERS FOR CANALS.



More information and particulars may be obtained by addressing David Thomson, No. 90 Beaver st., or James Montgomery, No. 4 Bowling Green, New York.

Iron Girders and Beams.

Messrs. Editors—I have read with much interest the articles in the Scientific American by Mr. B. Severson on the form for iron girders, and agree with him in some important or material facts, but in others, perhaps equally material, I do not. I agree with him that there is no neutral axis in a beam or girder, although there is a neutral point, but disagree as to the curve of equilibrium for an arch uniformly loaded. It has been demonstrated by writers on the strength



of materials that when a beam is uniformly loaded, which has a straight line for its lower side, and equal thickness throughout its length, its upper side should form a semi-elliptical curve which agrees so nearly with the curve, the result of his own theorizing, that I think he has little cause to complain of older theorists than himself on that question. If a rectangular form of girder is adopted, which is the one best suited to the art of construction, the greatest strength, and perhaps the greatest stiffness, with a given amount of material, may be obtained by decreasing the cross section of the top and bottom flanges from the center of the length of the girder to its ends, and by increasing the thickness of the vertical web, from the center to the ends—the web being thin at the center, and the flanges thin at the ends.

There are neutral points (to horizontal strain) along the entire length of a beam, if each vertical section is compared with itself alone, but this will not do, inasmuch as the beam or girder must be considered as a whole, and the transfer of strains from one point to another, and when this is done there is but one neutral point in a beam, and that is its center. There must be some resisting force or forces, or fulcrum, between the two, tensive and compressive, forces in the lower and upper halves of a girder, to bring these forces into action. This I believe to be the cohesive force of the particles along the entire line of the girder.

The intensity of the vertical and horizontal forces which operate in a beam or girder uniformly loaded, may be represented by the lines in Fig. 1, but the direction or resultants of these forces I believe to be more truly represented by the lines in Figs. 2 and 3. In Fig. 1, the horizontal lines above and below *c* represent the intensity of the horizontal compressive and tensive forces at points along the line. *a b c*, being the neutral point, and the vertical lines to the right and left of *c* represent the intensity of the vertical forces along the line, *e f c*, being the neutral point. If the forces that act horizontally along the line, *a b*, and are represented in intensity by the horizontal lines in Fig. 1, continue to act horizontally throughout the length of the girder, or from *a* to *g*, and from *a* to *i*, from *b* to *h* and from *b* to *j*, the tendency would be for the particles of the girder to separate or move along the lines, *c g*, *c i*, *c h*, and *c j*. This I conceive not to be the tendency or result of the forces, and believe that the oblique straight lines in Fig. 2, or oblique curved lines in Fig. 3 to represent more nearly the resultants of the vertical and horizontal forces acting in the beam. The intensities of the strains along the upper and lower lines of the beam are represented by the length of the bases of the small triangles, being greatest in the middle, and least at the ends of the beam. It would be a result, and one to be looked for from the lines drawn in Figs. 2 and 3 that a rectangular beam would deflect less with a load placed in the middle or uniformly distributed over it than a beam with less depth near the ends, which is a fact. Whatever the amount of horizontal forces, compressive and extensive, exerted on the lines, a' b' or a'' b'', must be met and resisted by the cohesion of the particles along the lines, e' f' or e'' f'', Figs. 2 and 3, produce equilibrium. I conceive that the particles near the top and bottom of a girder, when deflection is produced by a weight, tend to move on or over the particles or fibers next to them, and nearer the center line of the girder—that the cohesion among the fibers resist this movement, and the force exerted on the particles farthest from the center line, are transferred from one another to the center line.

Dayton, Ohio, January, 1858.

D. H. Morrison.

[Concluded next week.]

Chimneys for Lamps.

V. L. Vodez, of London, has obtained a patent for placing a disk of fine iron-wire gauze on the upper part of a chimney or glass of a lamp. The edge of this disk of gauze is raised at its edge so as to sit on the chimney, and it is capable of being put on and taken off freely. It is stated that this improvement tends to prevent the lamp from smoking, and at the same time improve the brightness of the flame.

Ipecacuanha a Cure for Delirium Tremens.

Dr. Gerhard Poali, physician to the Bridewell City Prison, of Chicago, Ill., recently read a paper before the Medical Society of that city, in which he stated that he had under his treatment last year 130 cases of delirium tremens, eight of which proved fatal, and this year up to the date of his lecture, 100, of which four proved fatal. He states that he had tried ipecacuanha in sixty cases with remarkable success; it quieted the nervous system, created an appetite, and uniformly produced sleep. When the case was not of too long standing he gave it as an emetic the first dose, and afterwards gave from fifteen to eighteen grains every other hour, using in the meantime shower baths, and giving the patients strong beef tea.

New Kind of Cider.

At the late meeting of the United States Agricultural Society, held at Washington, D. C., Mr. A. Jenks, a Virginia farmer, produced a number of bottles of good cider, made from the juice of the sorgho, or Chinese sugar-cane. Mr. Jenks' process is very simple. He treats the juice to bring the feculent matters to the top, whence he removes them by skimming. He then barrels or bottles the liquor, and lets it stand. In about eight days it has become cider, and when fermentation has advanced to the right stage, he bottles it and preserves it as champagne.

Chapped Hands.—A good recipe is almond oil or sweet oil, 3 ounces, spermaceti, 4 ounces, pulverised camphor, 1 ounce; dissolve in an earthern vessel by the aid of heat, and stir while it is cooling. Apply night and morning.

MECHANICS

INVENTORS, MILLWRIGHTS. FARMERS, AND MANUFACTURERS.

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