

W. O. BUCHANAN.

Improvement in Apparatus for Towing Canal Boats.

No. 124,326.

Patented March 5, 1872.

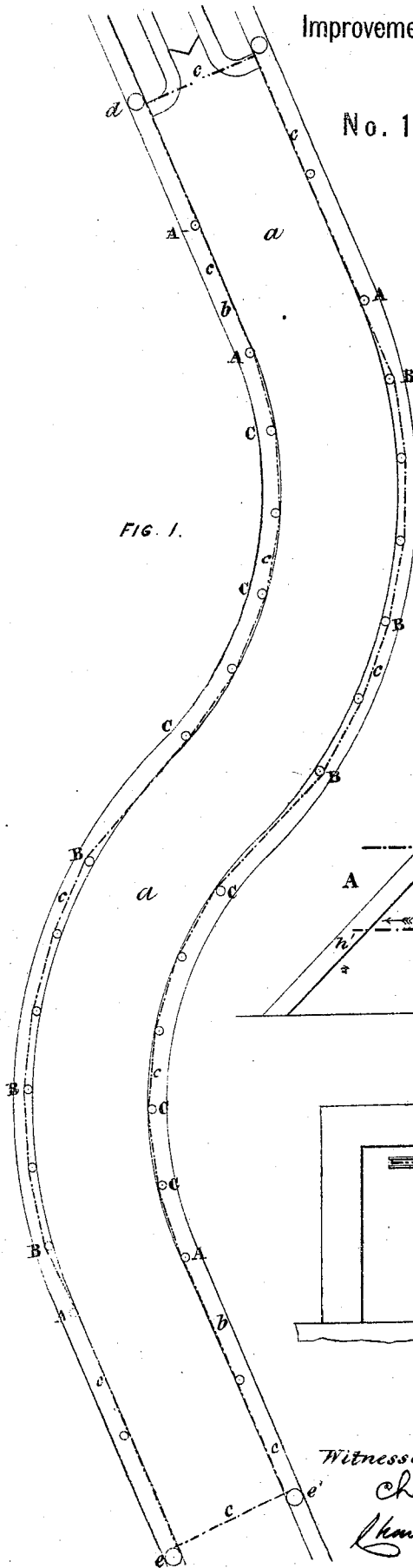


FIG. 1.

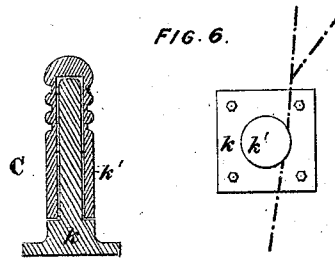


FIG. 6.

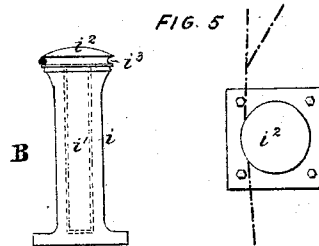


FIG. 5.

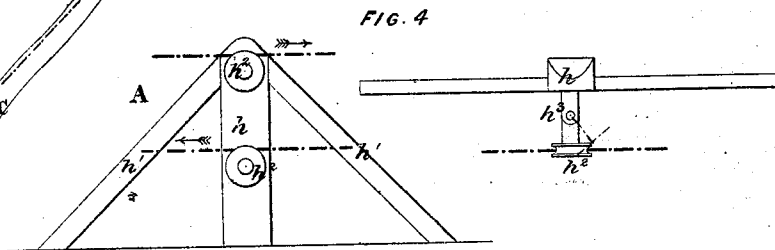


FIG. 4.

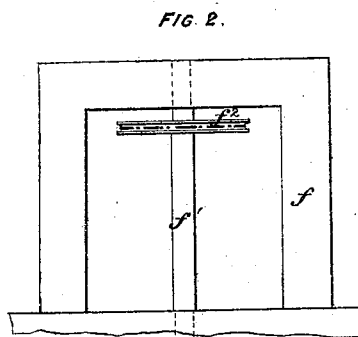


FIG. 2.

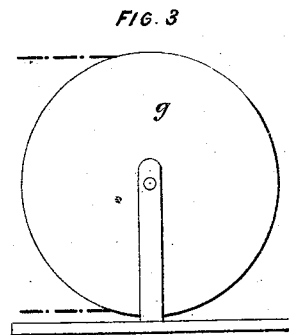


FIG. 3.

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Witnesses

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IMPROVEMENT IN APPARATUS FOR TOWING CANAL-BOATS.

Specification forming part of Letters Patent No. 124,326, dated March 5, 1872.

SPECIFICATION.

To all whom it may concern:

Be it known that I, WILLIAM OLIVER BUCHANAN, of the city of Montreal, in the district of Montreal, in the Province of Quebec, Canada, civil engineer, have invented new and useful "Improvements on the Art of Towing Vessels and Apparatus used therefor;" and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawing, where—

Figure 1 represents a general plan of canal and outline of the application of my invention. Fig. 2 represents an elevation of terminal drum, first modification. Fig. 3 represents an elevation of terminal drum, second modification. Fig. 4 represents a plan and elevation of main-line bearing-post, first modification. Fig. 5 represents a plan and elevation of main-line bearing-post, second modification. Fig. 6 represents a plan and elevation of main-line bearing-post, third modification.

This invention has reference to an art of towing vessels on canals and other inland waters, to obviate the attrition and consequent destruction of their sides or banks by the agitation of the water by steamers, and to supersede the slow and expensive operation of towing by horses.

My invention consists in placing along each bank of the canal an endless rope, made of iron or steel wire, or other suitable material, moving around a pulley or drum placed at each end of such section to be worked; the said rope to rest upon and pass over small intermediate pulleys or sheaves of iron placed on posts of wood or iron firmly fixed in the earth at suitable distances; these pulleys to revolve freely on their axis with the movement of the rope, lying in and passing over them. They may require to work on a hinge, so as in some degree to conform to the more direct line of draft. Motion is given to said rope by stationary power of steam, water, &c., placed at the ends of each section, and moving at a suitable speed. There will be at regular distances short pieces of smaller rope inserted or spliced into the main rope, of suitable lengths, having a flexible eye at the end; to this the tow-

line of the boat may be attached or detached at pleasure. These loops or short pieces will pass freely over and around the various pulleys or sheaves at each support, as well as over the terminal pulleys or drum of each section.

In passing round curves the posts will be more frequent and placed at points to conform to the shape of the curve. For convex curves these posts will be of cast-iron, cast in two pieces, the inner one firmly fixed in the ground or on blocks of stone set in the earth. The outer piece or shell revolves on the inner one. There will be corrugations on the outside surface to receive and hold the rope pressing against it in passing the curve. For passing concave curves there will also be a cast-iron post placed at such distances as will conform with the shape of the curve. These posts will also be cast in two pieces; the cap or top portion will revolve on a pivot, fitting into a socket formed by the bottom portion of the post. There will be a groove in the revolving cap to receive the moving rope pressing against it on the outside of the post, their height being regulated so as to enable the tow-line to free itself in passing by slipping over the rounded top or cap as it revolves. A piece of iron may be attached over the top of the post, arranged so as to facilitate the tow-line freeing itself.

The supports used on straight portions of the canal may be of wood firmly fixed in the earth, with braces set longitudinally with the canal, and placed so as to interfere as little as possible with the ordinary traffic of the canal by horses. Suitable stationary power must be provided at each terminal, moving the pulleys or drums giving motion to the endless rope.

The tow-lines of the boats using this system must be provided with a hook at the end, which can be placed in the loops as they pass along up and down on either side of the canal. On starting a boat from a state of rest, provision must be made on the boat to pay out the tow-line gradually till the boat gets under headway, and which then may be hauled in to the necessary length.

A man must accompany each boat to attend to the attaching and detaching of the

tow-line, as required. The rope at the terminals may pass over or under the canal, as circumstances will permit.

Cases may occur where it may be desirable to provide for using only one side of the canal. This may be done by arranging the terminal pulleys vertically, and having additional pulleys on the supports, the one above the other, the boats passing each other in the way now in use. This arrangement will also require additional posts on the curves.

It may be found desirable to have two engines at each station, one on each side of the canal. By arranging the attaching-ropes at regular distances, no more strain can be put on the rope than it will safely bear. When both sides of the canal are used, the one for up and the other for down trade, great facilities will be afforded for passing boats.

Provision may be made for tightening the rope, when from use or other causes it becomes too slack, by wedging up at the terminal frames.

With the above general remarks I will now more particularly describe the details or exact construction of my invention.

In the drawing hereunto annexed similar letters of reference indicate like parts.

Referring to Fig. 1, letter *a* is a canal of ordinary form, and to better illustrate my invention it is shown with a double or S bend in it, while the two ends are represented as straight; and, referring to one bank of the canal, it may thus be said to have a concave and convex curve. Its banks will, therefore, be, where concave on the one side, convex on the other, and vice versa. *b* is the towing-path on each bank. The length of the main endless line *c* will be arranged to suit circumstances, say a few miles apart. These are represented by the points *d* and *e*. At these points the terminal pulleys, as shown in Figs. 2 and 3, are situated. The one in Fig. 2 consists of a framework, *f*, supporting a vertical shaft, *f*¹. On this a horizontal pulley, *f*², is placed, with a groove to receive one or more turns of the main endless line upon it. This shaft and pulley are made to revolve by steam, water, or other power transmitted by gearing, or in any of the desired ordinary ways, and thus impart motion to the line. The pulley *g*, shown in Fig. 3, is the same as that above described, only being vertically situated, with the necessary changes thereby involved. To provide for the slacking of the line *c*, the pulley framework in Figs. 2 and 3 may be so arranged as to be screwed on or wedged outward to give the necessary tension.

Fig. 4 represents the bearing-post for straight portions of the canal, and consists of a wooden post, *h*, with its lower end driven into the earth, or otherwise set in it. This is supported longitudinally with the canal by braces *h*¹. On the front side of the post *h*, or that side of it nearest to the canal, an iron pulley, *h*², is attached by a hinged pivot-bar, *h*³, the hinge

being so arranged that the pulley may turn about horizontally, as indicated by dotted lines in the figure, to accommodate any diverging of the line *c* caused by the strain of the vessel being towed. The post may also be provided with another pulley of similar character, so that, when the line *c* is not desired to be passed along both sides of the canal, it may pass over the lower one, as indicated in this figure; the whole of the towing in this case being done from one bank, it being only necessary when boats going in opposite directions meet to let go the tow-line of one and attach it again after they have passed; or the line may be slacked up to allow the other boat to pass over it. In afterward referring to the posts thus described, they will be called A.

Fig. 5 represents the form of post I use on concave-curved bank. This consists of a cast-iron cylinder, *i*, with suitable base, secured to a block of stone or wood bedded in the ground. Inside the cylinder a revolving shaft, *i*¹, is placed, with friction-rollers suitably arranged between the sides of the two. This revolving shaft is provided with a cap, *i*², made in one with the shaft, and by the length of the shaft the bottom of the cap is elevated just free from resting upon the top edge of the cylinder. The cap is provided with a groove, *i*³, in which the line *c* passes on the opposite side of the post to that on which the canal is situated, so that the tension of the line *c* causes it to press into this groove, and when acted upon by the tow-lines of boats it has a further tendency for that purpose. These posts, as above constructed, will be called B when hereinafter referred to.

Fig. 6 represents the form of post I use on convex-curved banks. It consists of two cast-iron parts, the one *k* being configured, as shown in the drawing, and attached to a block of wood or stone bedded in the earth, and receiving upon its upper portion an inverted cast-iron cylinder, *k*¹, with friction-rollers interposed between the two; the upper portion of the cylinder being grooved or corrugated to receive the line *c*, which in this case passes on that side of it nearest to the canal, being firmly pressed into the corrugations by the tension of the line. These posts will be called C.

Referring again to Fig. 1, it will be seen that these three modifications of bearing-post are used as therein represented by the letters A B C; it will at once be understood how they are arranged as regards one another and the canal. At the terminals *d* and *e* the line *c* crosses the canal, on being elevated on suitable posts or otherwise at such height that the boats can pass under it; or it may be led by a tunnel or culvert under the canal.

In all cases the power actuating the line *c* will be applied at the point or points most advantageous to the working of my invention.

Having now described the construction and operation of my invention, to which I have given the name of "Buchanan's art of towing vessels," what I claim as my invention, and

wish secured by Letters Patent, is the new and useful "improvements on the art of towing vessels and apparatus used therefor," as follows:

1. The bearing-post A, in combination with the line *c*, substantially as and for the purpose set forth.

2. The bearing-post B, in combination with the line *c*, substantially as and for the purpose set forth.

3. The bearing-post C, in combination with the line *c*, substantially as and for the purpose set forth.

Montreal, 15th day of May, A. D. 1871.

W. O. BUCHANAN.

Witnesses:

CHARLES LEGGE,

CHARLES G. C. SIMPSON.