2 Sheets—Sheet 1.

O. DE MESNIL & M. EYTH.

MACHINE FOR TOWING CANAL BOATS.

No. 103,724. Patented May 31, 1870.

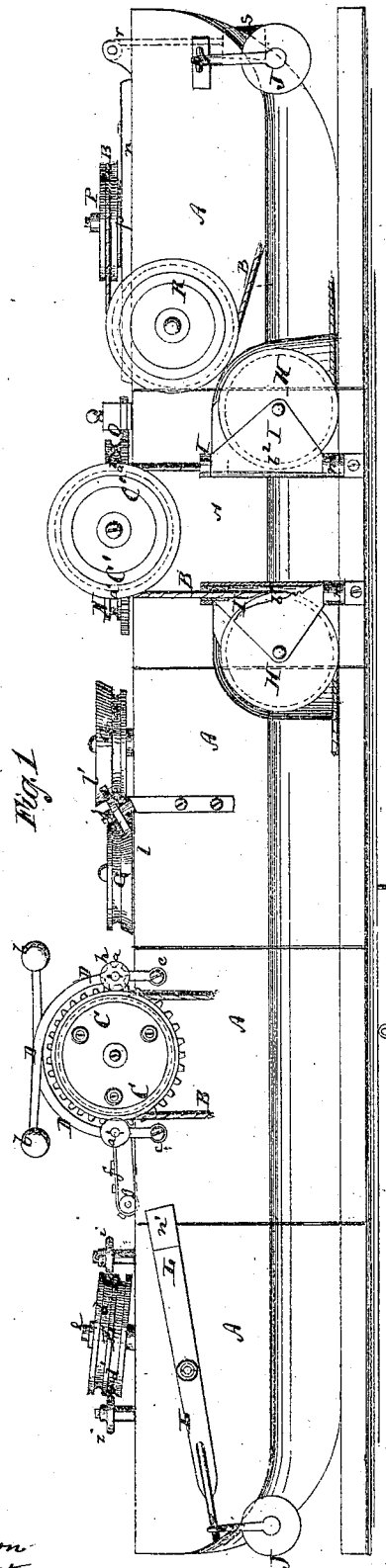

Fig. 1.

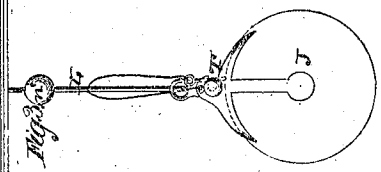

Fig. 2.

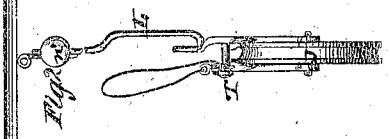

Fig. 3.

Witnesses:

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Inventor:

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2 Sheets—Sheet 2.

O. DE MESNIL & M. EYTH.

MACHINE FOR TOWING CANAL BOATS.

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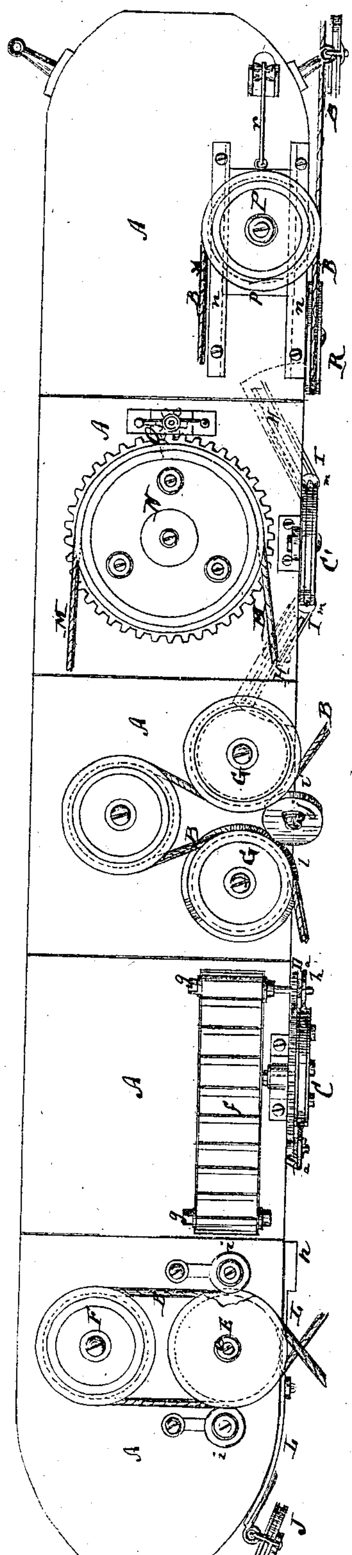
Fig. 4.



Witnesses:

Inventor: Baron O. De Mesnil, M. Eyth, Per Munn & Co., Attorneys.

United States Patent Office.

OSCAR DE MESNIL, OF BRUSSELS, BELGIUM, AND MAX EYTH, OF STUTTGART, WÜRTEMBERG.

Letters Patent No. 103,724, *dated May* 31, 1870.

IMPROVEMENT IN MACHINERY FOR TOWING CANAL-BOATS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that we, Baron OSCAR DE MESNIL, of Brussels, Belgium, and MAX EYTH, of Stuttgart, Würtemberg, Germany, have invented a new and useful Improvement in Machinery for Towing Canal-Boats and other vessels on a fixed rope or chain; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification.

Figure 1, sheet 1, represents a side view of a canal-boat, showing several modifications of our invention.

Figure 2, sheet 1, is an edge view of a weighted roller employed on the same.

Figure 3, sheet 1, is a side view of the same.

Figure 4 is a plan or top view of the boat.

Similar letters of reference indicate corresponding parts.

This invention has for its object to provide simple means whereby canal or tug-boats and other vessels can be moved forward along a fixed rope or chain, by the aid of machinery provided on such boat, or on a tug-boat.

The main invention consists in arranging on such a boat devices for regulating the slack of the rope, and for keeping the moving rollers in proper relative action.

The invention consists also in a new mode of steering machinery, by which the tug-boat can be directed without a rudder.

A, in the drawing, represents a tug-boat of suitable construction and size.

This is intended to be propelled by a rope or chain, B, which is stretched along the river, canal, or other water-course through which the boat is to pass.

In the drawing the various phases of this invention are shown, all applied to one boat.

The boat is, by transverse lines, shown to be divided into five sections, each section containing at least one independent part of the invention.

The motion may be applied to the driving-pulley or drum C by hand or other power.

We may also impart motion by a horse, or other animal, which, said animal being made to walk on an inclined plane or endless apron, *f*, causes the said apron to revolve the rollers *g g*.

Upon the axis of one of these rollers *g g* is affixed a pinion, *h*, which pinion takes into the teeth on the edge of the drum C, so that rotary motion is thereby imparted to the drum.

In towing vessels or boats along a rope or chain, B, the said rope or chain should be held in close contact with a certain portion of the periphery of the driving-drum C, by means of press-pulleys.

The requisite pressure may be applied by means of springs, the pressure of such springs being regulated by the driver, whose want of experience may, however, lead to his applying undue pressure to the press-pulleys, thus producing unnecessary friction on the rope.

We prevent such injurious effect upon the rope by giving the requisite pressure to the press-pulleys *a a* by means of weights *b*, carried by levers D, the pulleys being hung on such levers as shown.

It will be seen that to remove the press-pulleys *a a* from the clip drum C, the levers D need only be raised, causing them to revolve partially on their pivots *c c*, and to remove the press-pulleys from the clip drum.

When the said press-pulleys *a a* are required to act again on the rope, the levers D are replaced in the position shown in the drawing, when the weights *b* press the pulleys against the rope with a constant pressure, which may be adjusted to suit the case.

The towing-rope or chain B is generally guided to and from the driving-drum by two guide-pulleys, one in front of and the other behind the axis of the driving-drum.

We propose to simplify this arrangement by using a single double-grooved pulley, E, to guide the rope or chain to and from the driving-drum.

The said double-grooved pulley is mounted on a slightly inclined axis, so that each groove is, at one point, in the same plane with the driving-drum F, viz: the inlet-groove at the point where the rope leaves the pulley to pass to the drum, and to the outlet-groove when the rope passes onto the pulley after leaving the drum F, and, consequently, these points of the pulley are on a line one with the others.

The guide-pulley, as in fig. 1, is formed with two grooves, *d* and *d'*.

The said pulley E is mounted on an inclined axis, *e*, as shown. This arrangement of the guide-pulley is less expensive than the two pulleys ordinarily used, and occasion less friction to the rope.

Another of our improvements in machinery for towing boats, consists in placing the press-pulleys round the periphery of the guide-pulleys, instead of placing them round the driving-drum F, by which modification we avoid the formation of slack between the clip-drum and the guide-pulley.

This is illustrated on the double-grooved pulley E, when two press-pulleys *i i* are used.

When two guide-pulleys, G G, are used, one single press-pulley can be set between the two guide-pulleys G to give the required pressure to both.

In this the pulley *j* receives rotary motion from the guide-pulley which leads the rope to the driving-drum, and communicates the said motion to the second guide-pulley, which draws off the rope.

It has been found, in practice, that when the two guide-pulleys, used in towing machinery, are not precisely of similar diameter, or if one of them has been worn more than the other, the chain or rope tends always to form a slack on leaving the driving-drum, and between the said drum and the guide-pulley, that is to say, one of the guide-pulleys brings to the drum more rope than the other guide-pulley can draw off. It is, therefore, desirable that the latter guide-pulley should have rather more motion imparted to it than the first, but such increase of motion should not cause undue friction to the rope, as would be the case if the motion of the second guide-pulley were greater than the amount of rope to be drawn off.

This result may be obtained by causing a friction-roller to communicate motion from one of the guide-pulleys G to the other, as shown in fig. 1, in which case each guide-pulley is formed with a conical collar, *l*.

The axis of the roller *j* is set inclined, so that one side of the friction-roller bears against the conical collar *l* of one guide-pulley G, and its other side against the collar *l* of the other pulley.

It will be seen from the drawing that, at *l'*, the roller *j* is in contact with the smaller circumference of the conical collar, and at *l* it bears against the larger circumference of the other collar, so that the velocities of the two pulleys G G are different.

It will also be seen that, if the roller *j* is adjusted, the relative velocities of the two pulleys will vary with the position of the said roller on its axis. By this means the velocity of the guide-pulley, drawing off the rope from the drum, may be readily adjusted.

Another of our improvements consists in mounting each guide-pulley on a swinging arm, I, capable of swinging on its axis, which axis is situated so as to keep the groove of the pulley always in a line with the edge of the driving-drum C', where the rope or chain passes upon or from the said drum, and to allow the said guide-pulleys to follow the direction of the rope or chain.

The swinging-arms I I are capable of motion around their axes *m m*, which are so situated that they keep the sides b^1 b^2 of the guide-pulleys H always on a line with the points a^1 a^2 of the driving-drum C'.

The rope is thus constantly guided to and from the drum *a*, whatever may be the inclination of the body of the pulleys.

This improvement is of great importance on curves, where considerable friction is produced on the guide-pulleys, when they cannot, automatically, follow the direction of the rope. The driving-drum and the guide-pulleys may be placed either in the interior of the boat or on the side thereof. In either case a space must be left to allow the guide-pulleys and arms to swing to either side, so as to follow the direction of the rope.

In front and in rear of the guide-pulleys, and at a certain distance from them, there are guide-rollers, J, to direct the rope to and from the guide-pulleys. These rollers are suspended to a fixed point, and, consequently, keep the rope always at a certain elevation, which frequently occasions too much friction.

In order to reduce this objectionable friction, we suspend each of the rollers to one end of a weighted pivoted lever, thus allowing the said rollers to follow the direction of the rope, and, consequently, reducing the friction on the said rope.

The outer guide-rollers, J, are hung on the ends of the levers L, which are pivoted to the side of the boat, and capable of motion on their pivots.

The other ends of the said levers are weighted, as at *n' n'*.

It will be seen that this mode of suspending the rollers allows them to follow the direction of the rope, and to rise and fall with the same.

Another of our improvements consists in a new mode of steering the tug which draws the boats, by means of the ropes or cables which connect it to the first boat it is towing.

The tug is connected to the said sides of the canal-boat by means of a rope or chain, M, which passes round a pulley, N, on the tug, which said pulley may be made to rotate in either direction by means of gearing, O.

If it be caused to rotate in one direction, the chain M will become shorter on one side, and *vice versa*. The tug will then assume an inclined position, and will move to the side where the chain is shortest.

The large pulley, N, may be replaced by two smaller pulleys, one on each side of the boat, and connected each to a separate rope or cable.

In towing boats along a rope or chain, it is often difficult to keep the rope or chain in its proper position in the bed of the river or canal. In curves, the tension on the rope tends to draw it tight and into a straight line, so as no longer to follow the curve.

For instance, if the bed of the river describes a portion of a circle, the submerged rope lying in the middle of the river will also describe a similar curve, but, when drawn upon by the action of the tug, the said rope will deviate from its position, and be brought closer to the inner side of the curve, and the tug will take up and lay behind it the slack which described the curve. By this means the slack of the rope will soon become irregularly spread in the river, and make it necessary to relay the rope.

Figs. 2 and 3 represent modifications of the lever L, showing a hinged cap, T, by which the rope is prevented from slipping off the pulley.

Having thus described our invention,

We claim as new and desire to secure by Letters Patent—

1. The endless apron *f*, rollers *g g*, pinion *h*, and driving spur-wheel, combined with the drum C, and press-pulleys *a a*, whereby animal power may be applied to the rope B, in the manner described, and for the purpose set forth.

2. The front leading-pulley J, suspended from the balanced lever L, in combination with the guide-pulleys, all relatively arranged on the boats, as shown in fig. 1 of drawing.

3. The double-grooved guide-pulley E, with slightly inclined axis, arranged in place of the two guide-pulleys ordinarily used, substantially as herein shown and described.

4. The single press-pulley *j*, acting on the conical portions *l l'* of the two guide-gulleys G, and receiving rotary motion from the tight rope, which motion it communicates to the slack-rope pulley, substantially as described and for the purpose set forth.

5. Driving the after guide-pulley faster than the front one, by means of friction-gear, for the purpose of taking up the slack of the rope as it leaves the driving-drum, substantially as described and illustrated.

6. The swinging guide-pulleys H, hung in pivoted frames I, either on the side or in the center of the boat, substantially as herein shown and described.

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