2 Sheets—Sheet 1.

B. R. COLE & S. B. KING.

MEANS FOR TOWING CANAL-BOATS.

No. 193,597. Patented July 31, 1877.

Figure 1

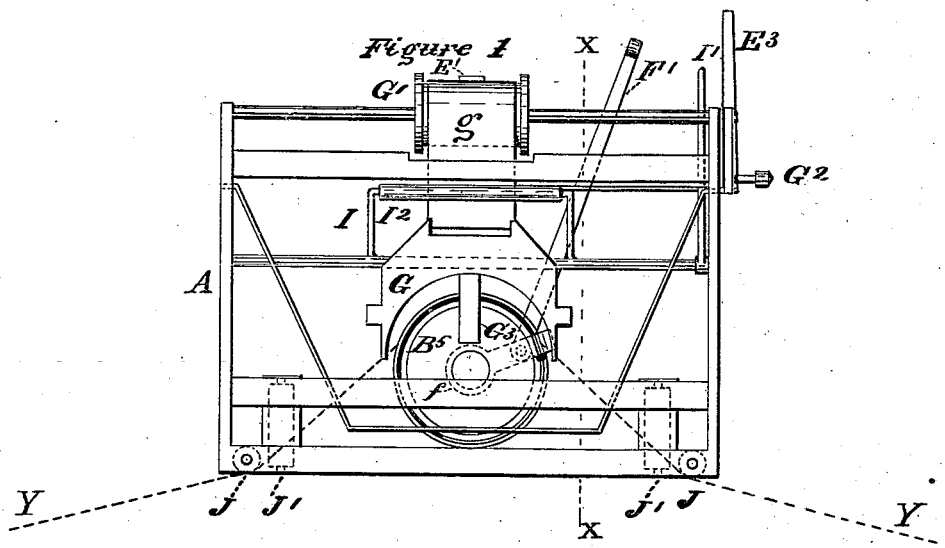


Figure 2

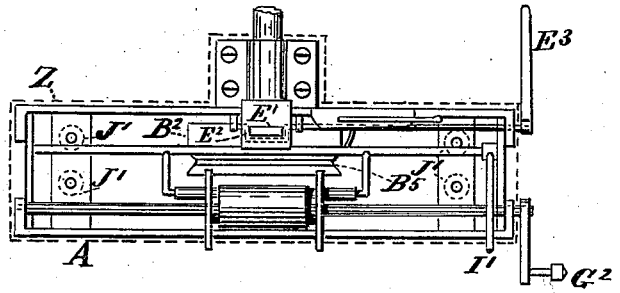
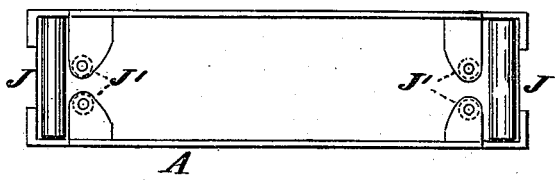


Figure 3.



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2 Sheets—Sheet 2.

B. R. COLE & S. B. KING.

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Figure 4

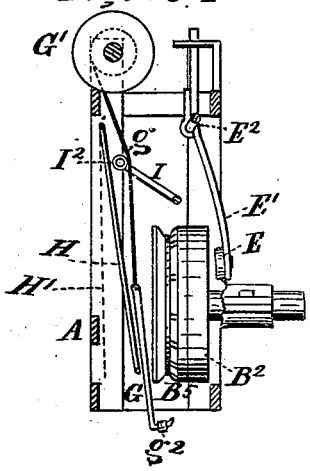
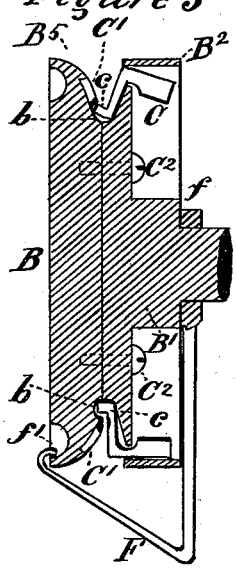


Figure 5



Fioure 6

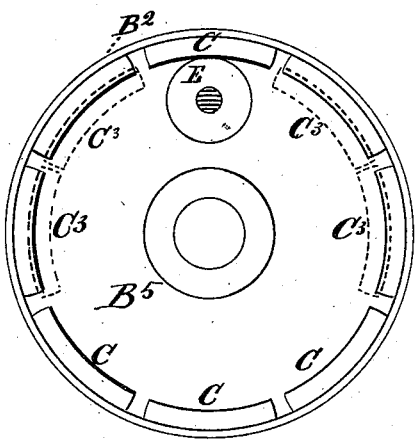
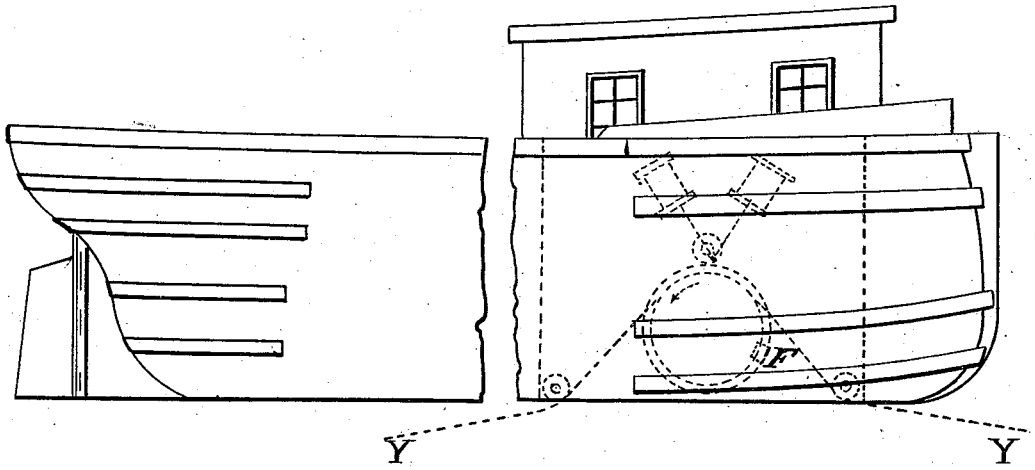


Figure 7



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UNITED STATES PATENT OFFICE.

BENJAMIN R. COLE AND SIDNEY B. KING, OF BUFFALO, NEW YORK.

IMPROVEMENT IN MEANS FOR TOWING CANAL-BOATS.

Specification forming part of Letters Patent No. **193,597**, dated July 31, 1877; application filed March 15, 1877.

To all whom it may concern:

Be it known that we, BENJAMIN R. COLE and SIDNEY B. KING, both of the city of Buffalo, in the county of Erie and State of New York, have jointly invented certain new and useful Improvements in Machinery for Towing Canal-Boats, which improvements are fully set forth in the following specification and accompanying drawings, in which—

Figure 1 represents a side elevation; Fig. 2, a plan or top view of the same. Fig. 3 is a bottom view of the frame-work, showing the arrangement of the rollers for guiding the the cable. Fig. 4 is a vertical section through line X X, Fig. 1. Fig. 5 represents a cross-section through the center of the cable-wheel, and a side view of the device for throwing off the cable, and the arrangement of the mechanism for grasping and preventing the same from slipping. Fig. 6 is a back view of the cable-wheel, showing also a part of the mechanism for grasping or releasing the cable. Figs. 5 and 6 being enlarged views. Fig. 7 represents the position of the machinery in a boat.

The object of our invention is to afford a cheap and convenient means for towing a canal-boat by means of what is known as the "Belgian cable," upon which system our invention is an improvement.

The first part of our invention consists in the arrangement of the cable-wheel, and its operating mechanism, at some convenient point on or near the line of the keelson, so as to be as near the longitudinal center of the boat as possible, and so that the cable may be grappled for and drawn up through the bottom of the boat into said wheel.

The second part of our invention relates to the cable-wheel; and it consists in the combination of two disks, a rim, and the clips for receiving and holding the cable, the disks composing the wheel being so formed as to leave a groove around the periphery of the same when put together, and so that the clips may be easily put in place, and so secured that while they are free to move, and release or grasp the cable, they cannot be detached when the disks and rim are put together, so as to complete the wheel. This part of our invention further consists in combining with said wheel a plate, or a series of plates, of vulcanized rubber, against which the cable is pressed by the clips, for the purpose of grasping the same more firmly, with as little injury thereto as possible.

The third part of our invention consists of a grappling device provided with friction-rollers to catch and prevent the wearing of the cable, and, as much as possible, the friction on the same when the boat is in motion, and with an angular piece to prevent the grapple from being caught in the cable-wheel while being let down, in combination with the mechanism for raising and lowering it.

The fourth part of our invention consists in the combination of a grappling device with a lever, arranged so that the grapple, when lowered below the center of the cable-wheel, may be moved and held in position to catch the cable when thrown from said wheel, for the purpose of relieving the cable from undue strain while the boat is rising in a lock, the grapple then going down as fast as the boat rises, the windlass or raising and lowering device being allowed to turn for that purpose, and for the further purpose of retaining the cable in the grapple, so that it may be quickly drawn up and placed in the wheel, thereby obviating the necessity of grappling for it after the boat leaves the lock.

The fifth part of our invention consists in the combination of a grappling device and a lever arranged so as to guide and move the grapple in the proper position for dropping the cable into the wheel.

The sixth part of our invention consists in the combination of the cable-wheel and an adjusting-lever for operating the clips for holding or releasing the cable, for the double purpose of operating the clips and adjusting their griping-power, and for moving the operating device of the clips out of the way when the device for throwing the cable from the wheel is brought into action.

The seventh part of our invention consists in the combination of a cable-wheel for towing boats with a device for throwing the cable therefrom when required, as will be more clearly hereinafter shown by reference to the said drawings, in which—

A represents the frame-work for holding the cable-wheel and its operating mechanism, the whole being arranged so that it can be lifted up out of its place when required for repairs. B^5 represents the cable-wheel. It con-

sists of the two disks B B^1, rim B^2, and clips C. (Shown in Figs. 5 and 6.) C^1 is the vulcanized rubber plate, which may be made in the form of a single ring, or in several pieces. C^2 represents the bolts for connecting the disks. The clips C are put in place before the wheel is put together by being fitted into notches made for the purpose in the periphery of disk B^1. The rim B^2 is then put on and the disks fastened together. The disk B is provided with a circular groove, *b*, into which the ends *c* of the clips project.

In Fig. 5 the upper clip C is shown open, so that the cable can run loosely through it. The lower one is represented as closed, as it would be while grasping the cable. Its own weight would bring it in that position. In operation the clips would hang about in the position shown by the dotted lines C^3, Fig. 6, the upper clip C being held up by means of the roller E, which is connected with the arm E^1. (Shown in Fig. 4; also in Figs. 1 and 2.) The arm E^1 is made movable by means of the crank E^2 and lever E^3, the arrangement being such that the roller E is moved downward and outward, and so that the lever E^3 may be weighted or connected with a spring, so as to regulate the griping-power of the clips.

F (shown in Figs. 5 and 7) represents the device for throwing the cable off from the wheel when required. It consists of an angular-shaped bar arranged to vibrate on the shaft at *f*, the other end being bent so as to pass into the groove in the front of the wheel at *f'* in Fig. 5, so as to prevent the cable from catching under that end at any time. It is operated by means of the lever F' in Fig. 1. Its operation will be understood by reference to Fig. 7. When the boat is moving forward the cable-wheel moves in the direction of the arrow, and when F is moved up to the cable, and under it with the motion of the wheel, it is evident that the cable will pass off by slipping over the inclined surface of F.

G represents the grappling device. It is connected by the belt *g*, or its equivalent, to the windlass G^1, provided with a crank, G^2, for operating it. The piece G^3 shown in Fig. 1 is formed or bent so as to prevent the grapple from catching on the cable-wheel when letting it down. The grappling-toes are provided with friction-rollers g^2. (Shown in Fig. 4.

The operation of this part of our invention when grappling for the cable is as follows: The lever H is moved by means of a hand-lever into the position shown by the dotted lines H', Fig. 4, and the grapple is then let down to the bottom of the canal. A movement of the boat sidewise causes the hooked toes and friction-rollers g^2 of the grapple to catch under the cable, which is then drawn up by the windlass G^1, and by means of the lever I and its moving arm or lever I^1 and friction-roller I^2 it is brought directly over the cable-wheel and lowered down on it, as shown in Figs. 1 and 7. The friction-rollers J and J', Figs. 1, 2, and 3, prevent the wearing of the cable as the boat moves along.

The operation of this part of our invention, when passing into a lock, is as follows: The grapple is first lowered down below the center of the wheel, and is then moved by the lever or arm H into the position shown in Fig. 4. The cable is now thrown off, and is caught by the grapple-toes and friction-rollers g^2, the windlass being allowed to turn as the boat rises, thereby releasing the cable from undue strain. After passing the lock, the cable is easily drawn up and put on the wheel. When locking down it is not necessary to throw off the cable.

The operation of the cable-wheel is easily understood, the roller E being arranged to press up against and close the clips as the wheel turns, causing the cable to be continually and firmly held at the upper part of the wheel, so that it cannot slip.

If necessary several of the rollers E may be used, so that more than one of said clips may be made to act at the same time.

The cable-wheel is driven by a steam-engine, which may be arranged in any well-known way.

In Fig. 7 we have shown a suitable arrangement of engines for the purpose. (Indicated by dotted lines.)

One important feature of our invention is that it takes but little space, and is arranged and combined with a water-box within the boat, so that it can be readily taken out for repairs, when required. The dotted lines Z in Fig. 2 represent about the shape of the said water-box, which is made water-tight, so as to prevent leakage into the boat.

We claim as our invention—

1. The cable-wheel B^5 and its operating mechanism, in combination with a water-box, Z, arranged within the boat, substantially as and for the purposes specified.

2. The combination of the disks B B^1, clips C, friction-roller E, arm E^1, and crank E^2, for the purpose of preventing the slipping of the cable and moving the roller E out of the way, substantially as described.

3. The cable-wheel B^5, provided with a rim, B^2, clips C, and rubber plates C^1, in combination with a frame, A, provided with the friction-rollers J J', for the purposes described.

4. The combination of the friction-rollers g^2 with a grappling device, G, for the purposes described.

5. The combination of the grapple G, belt *g*, lever I, and arm I^1 with the windlass G^1, for the purpose of dropping the cable into the wheel, substantially as described.

6. The cable-wheel B^5, in combination with the angular arms F and F', for the purpose of throwing the cable off from the wheel, as specified.

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