No. 661,663. Patented Nov. 13, 1900.

C. A. B. D. KÖTTGEN.

MEANS FOR TOWING CANAL BOATS.

(Application filed Oct. 14, 1898.)

(No Model.) 2 Sheets—Sheet 1.

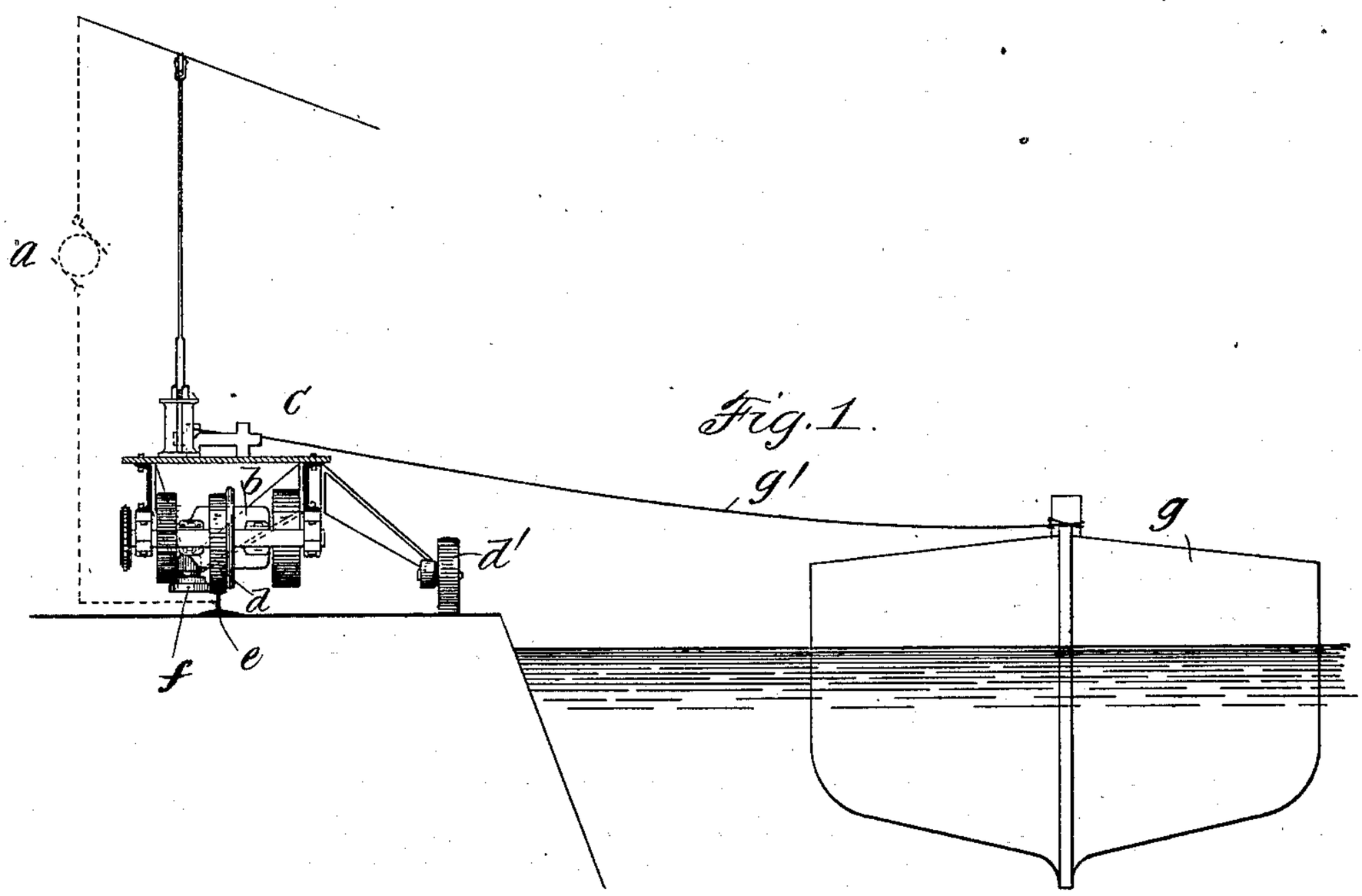
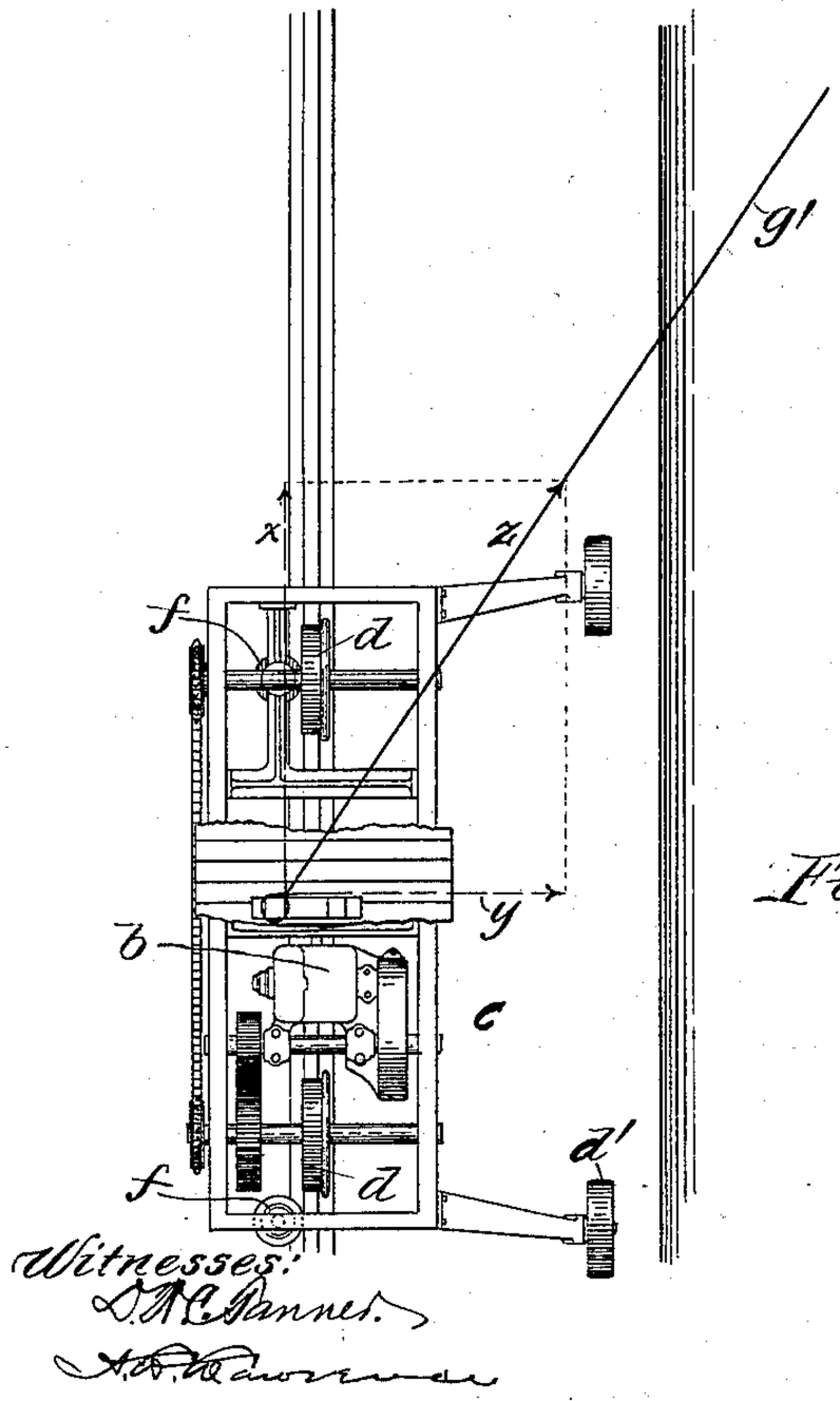


Fig. 1.



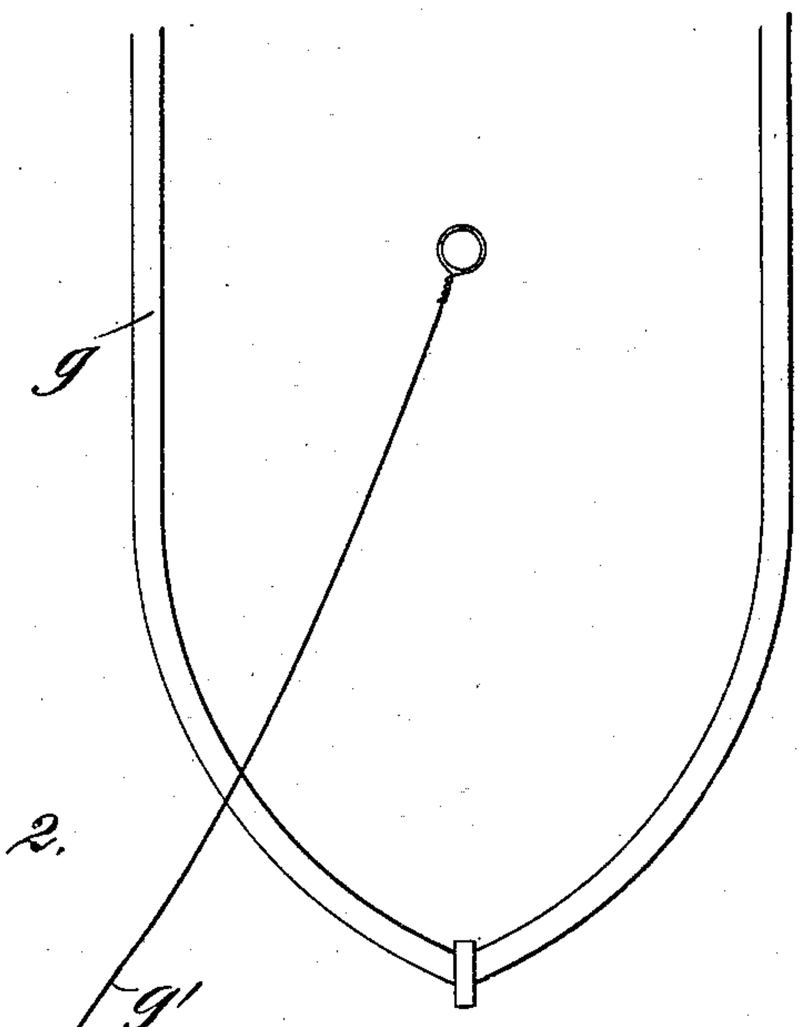


Fig. 2.

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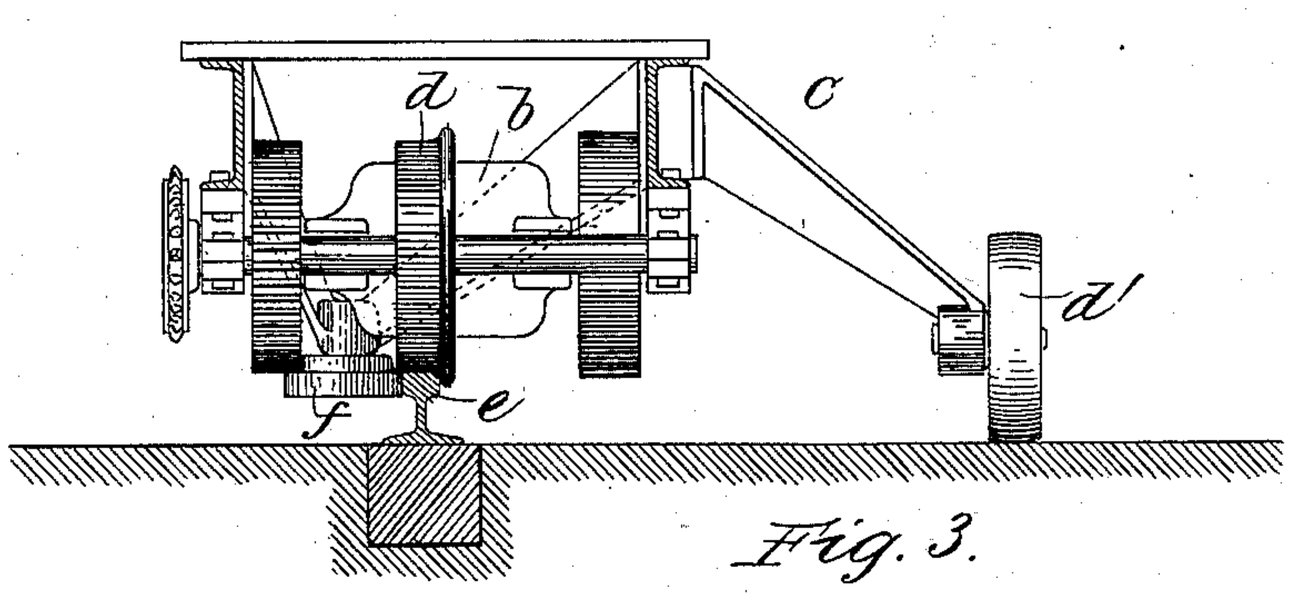


Fig. 3.

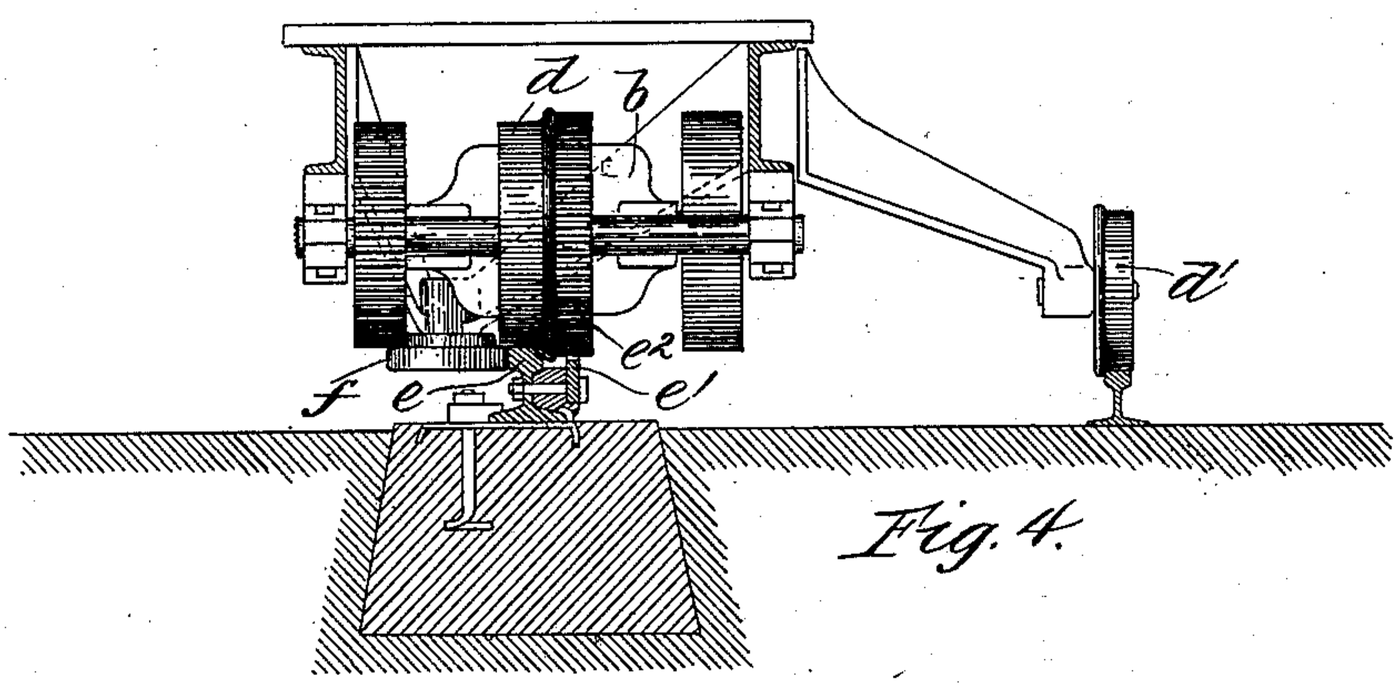


Fig. 4.

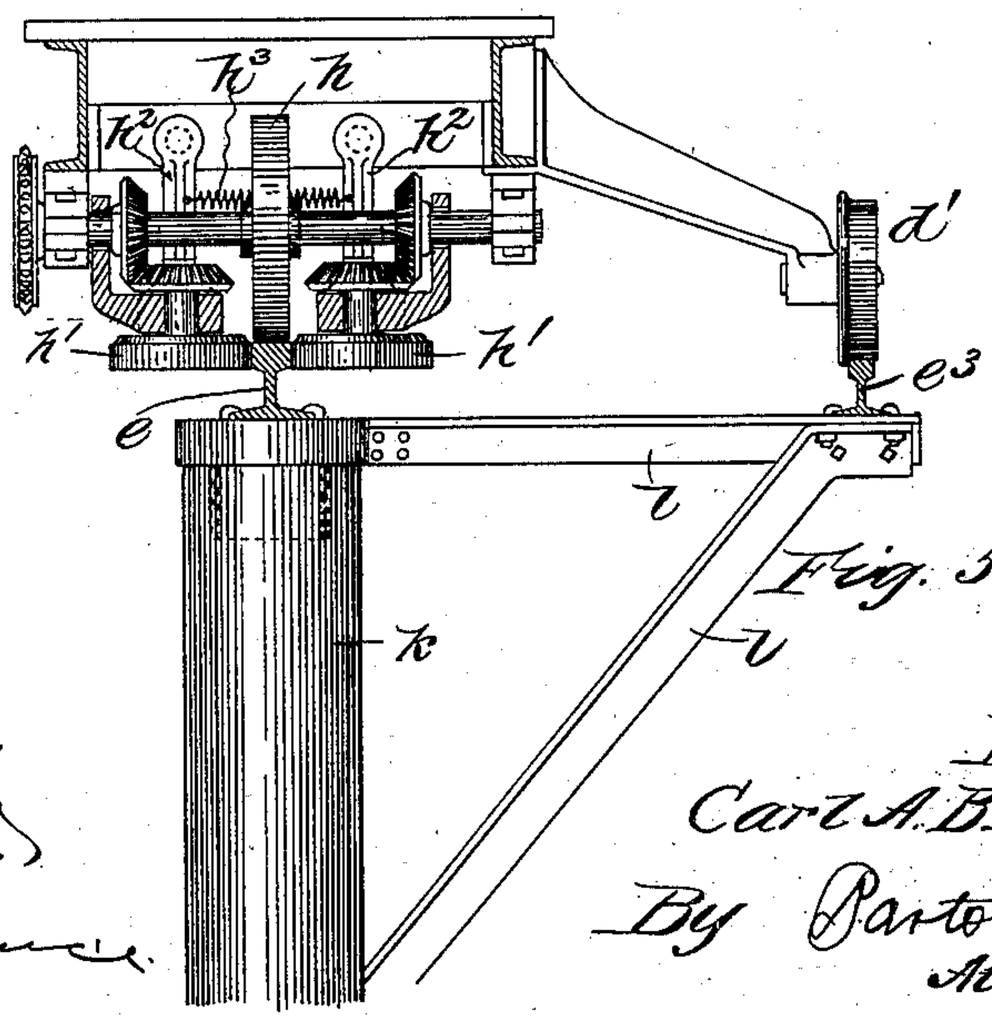


Fig. 5.

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UNITED STATES PATENT OFFICE.

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MEANS FOR TOWING CANAL-BOATS.

SPECIFICATION forming part of Letters Patent No. 661,663, dated November 13, 1900.

Application filed October 14, 1898. Serial No. 693,545. (No model.)

To all whom it may concern:

Be it known that I, CARL ARNOLD BERNARD DANIEL KÖTTGEN, a subject of the Emperor of Germany, residing at Charlottenburg, Germany, have invented a certain new and useful Improvement in Traction-Motors for Towing, (Case 163,) of which the following is a full, clear, concise, and exact description.

My invention relates to improvements in traction-motors for towing vessels on canals or waterways, the object of my said invention being to provide a motor for the above purpose which will be efficient and at the same time secure a saving in the cost of construction and maintenance.

Inasmuch as I have provided means whereby the single rail may be made to take up both the tractive and laterally-acting components which are commonly found in towing the system becomes entirely practical with but half the outlay for road-bed which is necessitated when two rails are used. Furthermore, the motor of my invention overcomes difficulties which would be experienced should an ordinary locomotive be employed upon a double line of rails.

I will describe my invention in connection with an electrically-propelled traction-motor which is adapted to draw boats along the line of a canal and which is provided with a single rail whereon the said motor travels. The motor is provided with a set of two or more traction-wheels which are disposed in alinement and bear upon the single rail in question. The weight of the motor is so disposed that substantially all is carried upon this set of traction-wheels, an additional wheel or wheels being provided at one side of the motor for the purpose of giving stability, which wheels preferably find their support upon the path or roadway. The traction-wheels are provided with coacting rollers which are adapted to engage the side of the rail-head and prevent the motor from being drawn from its position upon the rail. Should the tractive moment not be sufficient, I may employ a gear-wheel and rack in connection with the traction-wheels, or, again, the side rollers may be developed into positively-driven pressure-rollers which are adapted to grip the sides of the rail, and thereby greatly increase the capacity of said motor for accomplishing its object.

My said invention will be more readily understood by referring to the accompanying drawings, wherein—

Figure 1 is a diagrammatic view, partly in vertical section, showing the motor resting upon its single rail on the embankment of a canal and connected with the barge to be towed. Fig. 2 is a plan view of the above. Fig. 3 is a detail view of the roadway and wheels of the motor, showing a single rail carried upon a stringer. Fig. 4 is a similar view illustrating the use of a geared traction-wheel and concrete foundations for the rail; and Fig. 5 shows an adaptation of my system wherein the motor is carried upon piles driven along or in the river-bed, the gripping-wheels being also indicated in said figure.

The same letter of reference is used to designate like parts in each of the several figures of the drawings.

The dynamo *a*, connected with the motor by a trolley-wire or any other suitable means of supplying current to the electric motor *b*, is adapted to furnish the power for the traction-motor *c*, shown upon the embankment, Fig. 1. For the traction-wheels *d* of the motor a single rail is provided, the said wheels being placed in alinement and adapted to bear thereon, whereby the greater portion of the weight of the traction-motor *c* is supported. Extending upon one side of the motor are the lateral supporting-wheels *d'*, which rest upon the path or roadway, although, if found necessary, a light rail may be laid or other provision may be made for supporting the auxiliary wheels. I preferably construct the motor so that four-fifths or five-sixths of the weight is carried upon the traction-wheels *d* and the rail *e*. At the sides of these wheels are provided rollers *f*, which engage the outside of the head of rail *e* and prevent the wheels from leaving the track. To make the purpose of my invention more clear, I have shown a boat *g*, connected by cable *g'* with the traction-motor, and have drawn in Fig. 2 the parallelogram of forces met with in towing the boat.

The component x indicates the tractive force exerted along the length of the rail, the component y the lateral force exerted in the direction perpendicular thereto, and the resultant z represents the force exerted upon the cable g' in towing the boat g. The traction-wheels d, driven by motors b, furnish the tractive effort x, while the rollers f counteract the lateral force y, being in engagement with the side of the rail-head. It will be seen that by the use of lateral rollers f instead of a double flanged wheel upon the traction-motor of my invention all liability of the latter to leave the rail by reason of this lateral force is prevented, whereas a flanged wheel would bind and result in wear of the engaging parts and, moreover, would be likely to frequent derailment.

The rail e may be laid upon a longitudinal stringer suitably anchored or bedded in the earth, as shown in Fig. 3, or it may be secured in masonry or concrete, as indicated in Fig. 4, or, again, said rail may be carried upon piles driven in the river-bed, as shown in Fig. 5. Fig. 4 illustrates the use of a rack e' in connection with the rail which is adapted to be engaged by a gear-wheel e^2, forming a part of the traction-wheel d, whereby the tractive moment of the motor may be indefinitely increased. In Fig. 5 the rail e carries supporting-rollers h, loosely mounted upon their shafts, bearing the weight of the motor. The laterally-acting pressure-rollers h', one or both of which may be driven by electric motors, are forced against the sides of the rail-head by means of springs or electromagnetism, securing thereby an enormous gripping action, which overcomes the necessity of using the rack and gear where a heavy tractive force is desired.

The construction illustrated in Fig. 5 is particularly adapted to secure the desired pressure of the rollers h' upon the sides of the rail e, roller h' being mounted to swing upon an arm h^2, the arms h^2 h^2 being united by a spring h^3, that tends to draw the same together, and thereby bring the rollers h' h' into firm engagement with the said rail.

A number of advantages accrue when the construction illustrated in Fig. 5 is employed for carrying the traction-motor. This is particularly adapted for use in marshy localities or along the banks of rivers or lakes where the boats make frequent stops or landings. Piles k are driven into the river-bed or along the desired path of the traction-motor, the same supporting the rail e upon longitudinal stringers, while provision is made for the lateral wheels d' by laying a light rail e^3 upon structural iron braces l, connected with the the said piles. A motor traveling upon the track as thus arranged, it will be seen, can proceed without interruption, since its line of travel may be elevated and so arranged that boats lying along the shore will in no manner be interfered with. This construction lends itself to river-courses where a towing-path is unobtainable or shallow stretches of lake or ocean.

When the rail is laid along the embankment, as illustrated in Figs. 3 and 4, the same preferably is located a sufficient distance from the edge of the bank to give the rail a firm foundation and enable it to resist the strain imparted by the traction-motor. For this purpose the side rollers f should engage the outer side of the rail-head. Obviously in positions along the embankment where it is found desirable provision for the support of the lateral wheels in the shape of a prepared path or light rails may be made with advantage.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a traction-motor adapted to travel upon a single rail, the combination with supporting-wheels placed in alinement and carrying the weight of the motor upon the single rail-head, of lateral rollers associated with said wheels, engaging the side of the rail and adapted to resist lateral strain, secondary wheels carried upon the motor by a laterally-extending frame in position to support a small portion of its weight and assist the lateral rollers, and electrical means for supplying the tractive power, substantially as described.

2. In a traction-motor adapted to travel upon a single rail, the combination with supporting-wheels placed in alinement and carrying the weight of the motor upon the single rail-head, of lateral rollers mounted in the motor-frame adjacent to the supporting-wheels in position to engage the side of the rail-head, adapted to resist lateral strain, secondary wheels carried upon the motor by a laterally-extending frame in position to support a small portion of its weight and assist the lateral rollers, and electrical means for supplying the tractive power, substantially as described.

3. In a traction-motor adapted to travel upon a single rail, the combination with wheels h carrying the major portion of the motor's weight and adapted to bear upon the top of the rail-head, of pressure-rollers h', means for forcing said pressure-rollers into close engagement with the sides of the rail-head, secondary wheels d' placed at one side of the motor, and electrical means for driving the pressure-rollers, whereby the traction-motor is propelled along the supporting-rail, substantially as described.

In witness whereof I hereunto subscribe my name this 20th day of September, A. D. 1898.

CARL ARNOLD BERNARD DANIEL KÖTTGEN.

Witnesses:
PAUL ROEDIGER,
C. H. DAY.