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A. DAVIDSON.

SYSTEM OF SUBMARINE TRANSPORTATION.

(Application filed Mar. 3, 1902.)

(No Model.)

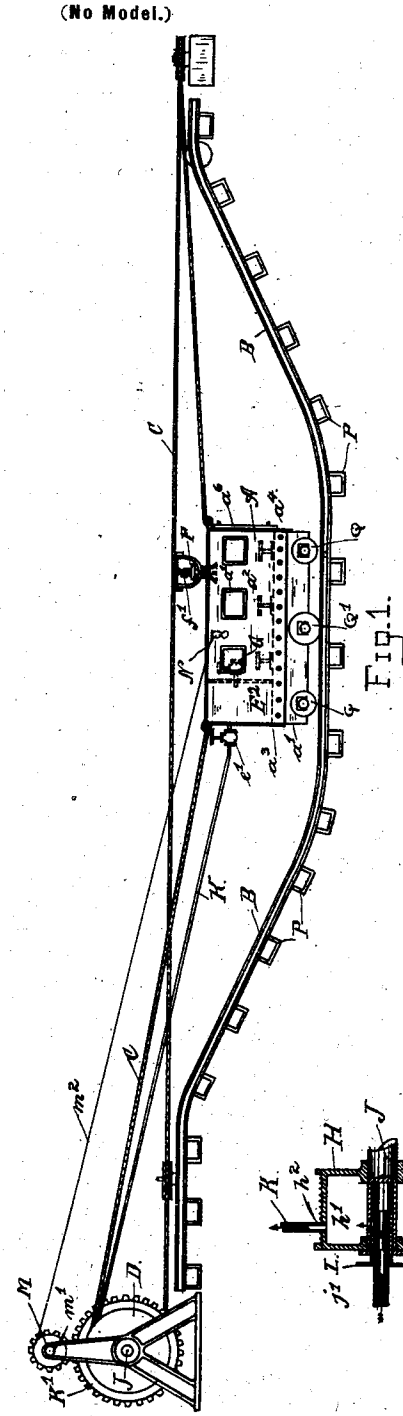

Fig. 1.

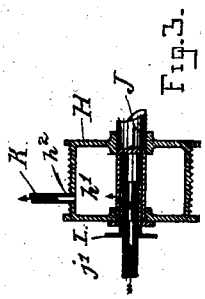

Fig. 3.

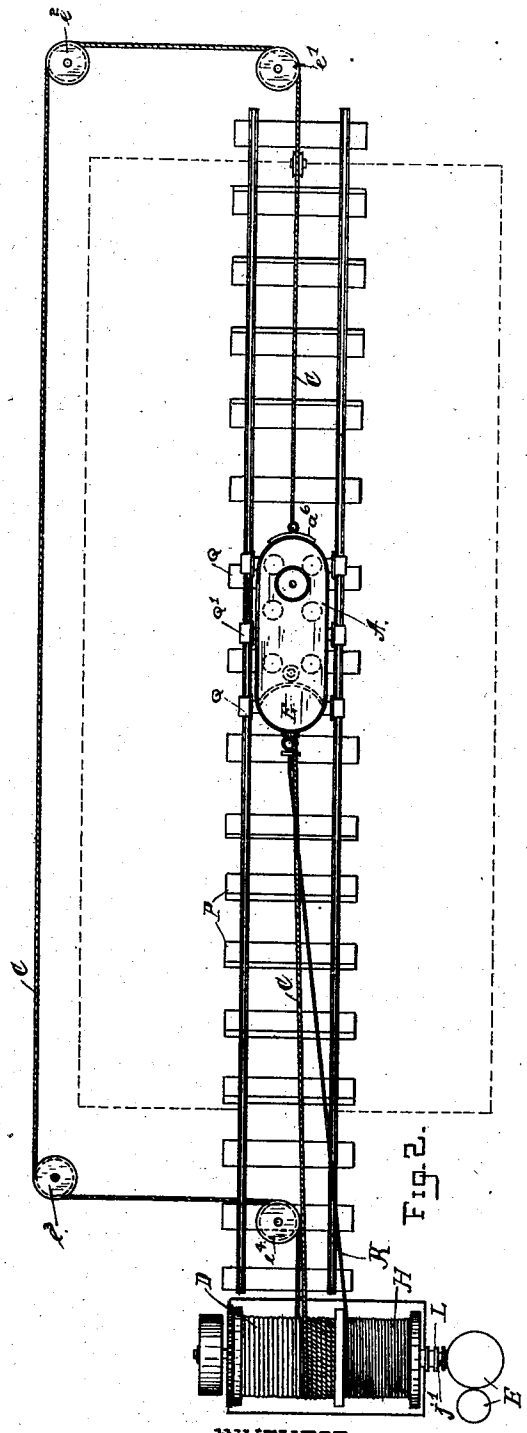

Fig. 2.

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SYSTEM OF SUBMARINE TRANSPORTATION.

SPECIFICATION forming part of Letters Patent No. 710,044, dated September 30, 1902.

Application filed March 3, 1902. Serial No. 96,520. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER DAVIDSON, a citizen of the United States, residing at Joliet, in the county of Will and State of Illinois, have invented certain new and useful Improvements in Systems of Submarine Transportation; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention appertains to a system of submarine transportation, and has for its objects the conveyance of passengers in cars or coaches below the surface of the water for purposes of pleasure, novel experience, or sensation, to facilitate the study and observance of submarine life, or to serve as a means of conveying persons across a stream where surface conveyance may for any reason be undesirable.

My invention includes within its scope a car for passengers, constructed in a water-tight manner and provided with an air-chamber or compartment. It includes a track built on a single or double incline from the shore to and along the bottom of the pond or stream of water, which may be natural or artificial, of means for hauling or propelling the car back and forth over the track, of means for supplying the car with air while submerged, and of suitable signaling devices or apparatus by which the conductor may indicate to the engineer on shore when to start or stop the car-propelling mechanism.

In this application I have shown and described a preferred adaptation of my invention, and suitable means or mechanism for carrying out the objects sought are embodied herein; but I do not wish to be limited to the specific forms shown, as my improved system may be carried out with various styles of devices and appliances and accomplish practically the same results attained by the means herein shown. For instance, I have shown a style of water-tight car especially adapted for use in my system; but it is manifest that various modifications may be made in the form or construction of said car without altering its function or general operation. I have shown two methods of supplying air to the car while submerged, and same may be used together or separately. I have illustrated a signal device in which the messages between the car and the shore are transmitted over wires electrically; but it will be apparent that a wireless system of telegraphy or telephony might be substituted therefor with advantage and economy.

In the accompanying drawings, which form a part of my application, Figure 1 shows in side elevation my improved system which forms the subject-matter of my invention. Fig. 2 shows a top plan view of the same; and Fig. 3 is a detail, partly in section, of a preferred form of supplying air to the car.

Referring to the drawings in detail, A represents a car for passengers; B, a double-incline track on which the car travels; C, an endless cable for hauling the car back and forth over the tracks, and D a drum on which the operating-cable is wound and which also serves as a storage-chamber for air supplied thereto under pressure from a compressor or pump E.

The car is formed with a cast-metal base a', sheet-metal sides a^2, with bowed or rounded ends a^3 a^4, all joints being made water-tight in any effective manner. At the front end a^3 is located a compartment or chamber E^2, adapted to hold air under pressure, and at the rear end a^4 is a door a^6, through which passengers are admitted and emitted, the casing around the door being made water-tight by any effective means. In the sides of the car are windows a^7, which are preferably set in rubber frames or with rubber faces, so as to exclude the water.

Extending through the roof of the car is a relief-valve F, through which the air is allowed to escape when necessary to change the atmosphere of the car or to provide a circulation of air, said valve being adapted to operate automatically when the air-pressure within the car exceeds the resistance of the valve-spring f'. Connected with the air-chamber E and located within the car is a reducing-valve G, by means of which the air is admitted automatically to the car from the air-chamber at any desired pressure. Connected with the same chamber, but on the exterior of the car, is a back-pressure valve e', with which is connected the air-supply pipe K, such connection being either permanent

or periodical at such times as it may be necessary to fill said chamber with air under pressure. If desirable, said chamber could be supplied with liquid air, in which case connection with the valve e' would be required only while the chamber was being filled. It will be apparent that the air-supply tank or chamber may be located on the land and a hose-pipe connection effected between it and the interior of the car, and such arrangement could be used auxiliary to the air-chamber in the car. I have shown such arrangement in Figs. 1 and 2 of the drawings.

H represents a chambered extension of the drum E, the whole being mounted on a hollow shaft J, with which is connected a pipe j', the other end of which connects with the air-compressor. A suitable opening in the shaft within the chamber h' permits the air which is admitted to the shaft under pressure to escape into the chamber, which in turn is provided with an opening h^2 in its side. Connected with this opening is a flexible hose-pipe K, which is of sufficient length to extend the full distance traveled by the car, the opposite end of said hose being connected with the back-pressure valve e' on said car. A practically air-tight joint is effected between the pipe j' and the hollow shaft by a suitable coupling L, as clearly shown in Fig. 3. The hose-pipe is wound and unwound on the surface of the drum as the car moves toward or away from the latter. Mounted above the drum on the same frame that supports the latter is a small drum M, its shaft M' carrying a gear-wheel which meshes with the larger gear k' on the main or drive shaft J. Secured to the face of the small drum is a suitably-insulated wire m^2, which is connected at its opposite end with the electrically-operated signal device N, located within the car, so that suitable signals may be given between the car and the shore, it being understood that return-wires are provided and that the equipment includes a suitable battery of any form. The wire or wires m^2 are wound and unwound upon the drum M as the car moves back and forth over the tracks.

Secured to the ends of the car, and preferably near its top or roof, is an endless cable C, which is wound on the drum E and is carried around grooved pulleys or wheels e^2, e^3, and e^4, which are mounted on suitable vertical shafts located in the ground adjacent to the pond.

It will be obvious that if necessary the endless cable may be dispensed with and the movement of the car in one direction be effected by gravity alone and on its return trip be drawn by a cable and that such construction would be resorted to in the use of my system on rivers or very large ponds or lakes where it would not be practicable to have a continuous cable for reasons that will be apparent.

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

1. A system of submarine transportation comprising an observation-car, a track over which said car is adapted to travel, means for propelling or hauling said car, means for supplying the car with air while submerged, and means for transmitting signals between the occupants of the car and persons on land, all substantially in the manner and for the purpose set forth.

2. A system of submarine transportation comprising an observation-car, a track over which said car is adapted to travel, means for hauling said car, means for supplying the car while submerged, with air, and for renewing said supply of air while submerged, and means for transmitting signals between the occupants of the car and persons on land, substantially as set forth.

3. A system of submarine transportation, comprising an observation-car, a track over which said car is adapted to travel, means located on shore for hauling said car, an air-compressor located on shore and connected with the car by a flexible pipe, and means for exhausting the foul air within the car, and for admitting fresh air as needed, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ALEXANDER DAVIDSON.

Witnesses:

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