No. 880,509. PATENTED MAR. 3, 1908.

A. H. DAVIS.

CURRENT MOTOR.

APPLICATION FILED OCT. 12, 1905.

2 SHEETS—SHEET 1.

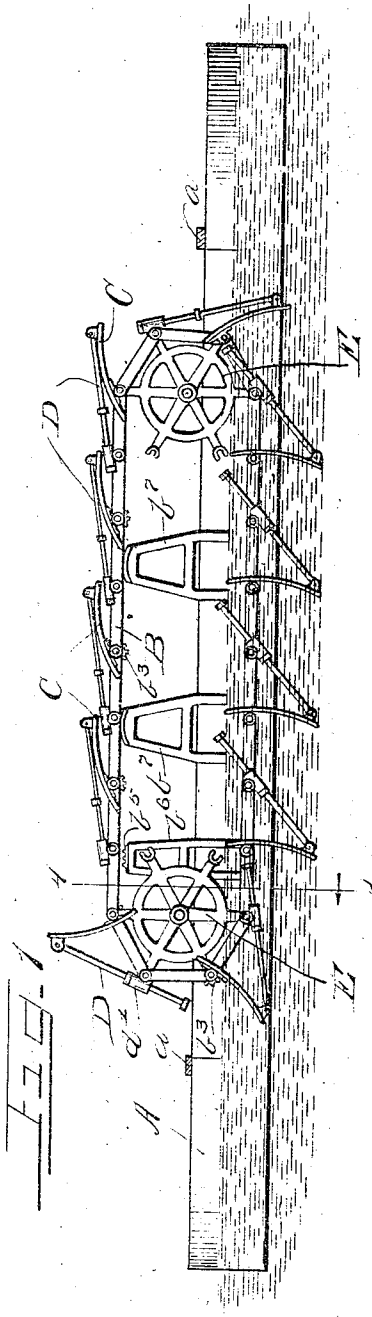


FIG. 1

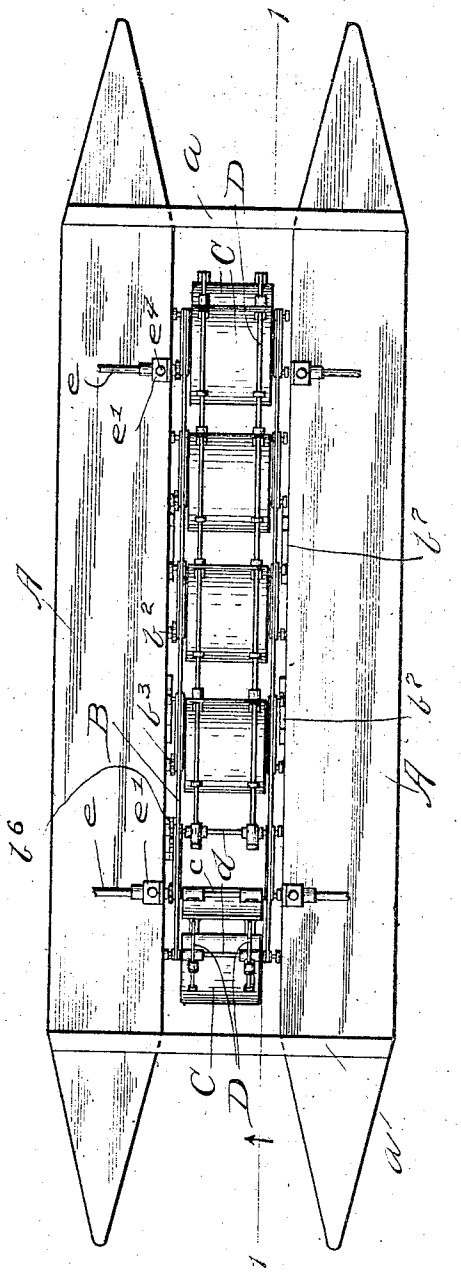


FIG. 2

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2 SHEETS—SHEET 2.

FIG. 3

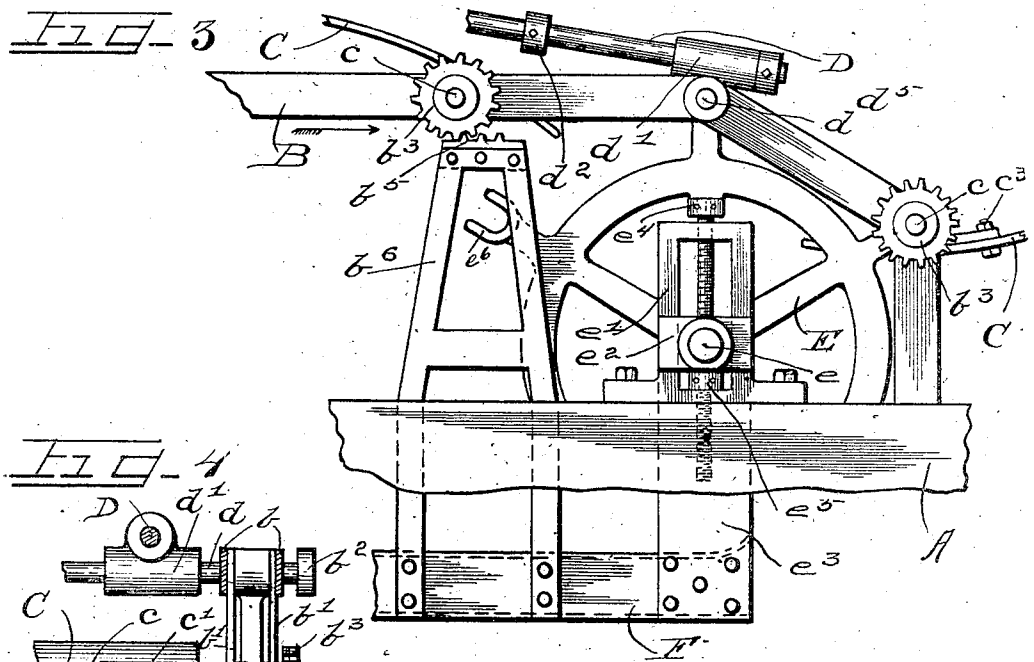


FIG. 4

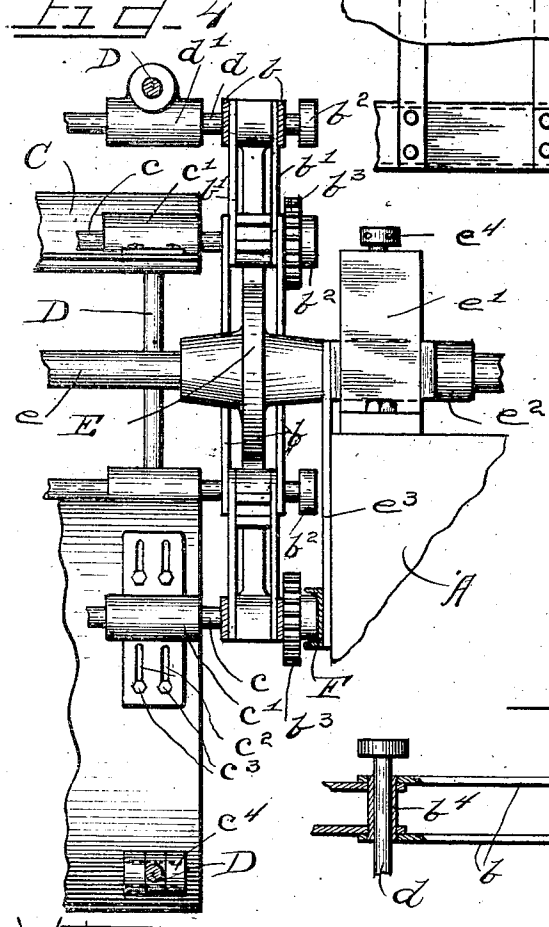


FIG. 5

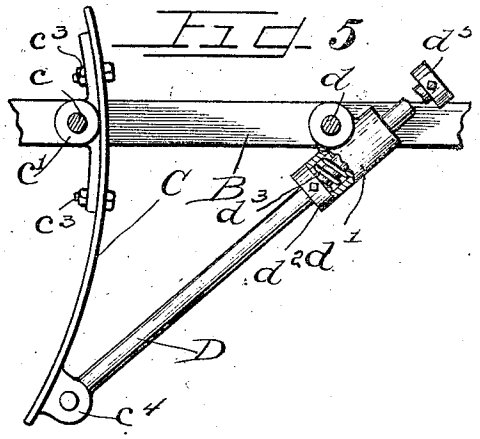
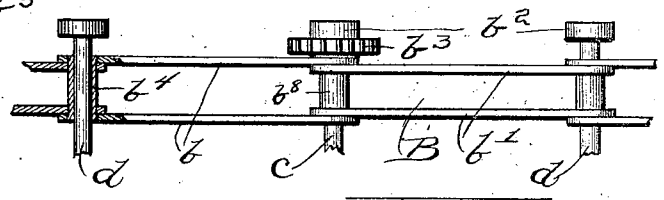


FIG. 6



Witnesses

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UNITED STATES PATENT OFFICE.

ALFRED H. DAVIS, OF BURLINGTON, IOWA.

CURRENT-MOTOR.

No. 880,509. Specification of Letters Patent. Patented March 3, 1908.

Application filed October 12, 1905. Serial No. 282,400.

To all whom it may concern:

Be it known that I, ALFRED H. DAVIS, citizen of the United States, residing at Burlington, in the county of Des Moines and State of Iowa, have invented certain new and useful Improvements in Current-Motors, of which the following is a specification.

This invention relates to improvements in that class of motors that is designed to utilize the force of a body of water in motion such as may be found in a river or in a race way and the especial object of the improvements which form the subject matter of this application is to provide a motor which will utilize in a maximum degree the full force exerted by the moving body of water which is projected against the blades or paddles of the motor.

A further object is to provide for the adjustability of the blades so that they can be adapted to deep or shallow water as may be desired and also to brace the blades so that they will effectively resist the pressure of the water.

An additional object is to so arrange the blades that they will take the water quickly at the front end of the motor, thus increasing the efficiency of the apparatus.

Other objects of general utility in the construction and arrangement of my improved apparatus will be apparent to those skilled in the art and need not be specifically mentioned.

In the accompanying drawings which form a part of this application:—Figure 1 is a side elevation of a motor constructed according to my invention, one of the supporting floats being removed; Fig. 2 is a top plan view of the motor complete; Fig. 3 is a detail on an enlarged scale showing the method of adjustably supporting the main driven shafts and adjacent parts, and the means for turning the paddles from inoperative to operative position; Fig. 4 is an end elevation of the parts shown in Fig. 3, and in addition thereto portions of the paddles; Fig. 5 is a fragmentary detail of a paddle and its brace; Fig. 6 is a plan view of a section of the drive chain which forms an important element of my invention.

Referring to the drawings in detail A, A, represent two floats which are constructed with pointed ends and are placed apart and suitably connected and braced by cross beams *a*. These floats are adapted to be partially submerged through the weight of the apparatus supported thereon.

Secured to the floats are journal boxes or yokes, e^1, on which are slidably mounted blocks e^2 in which the shafts *e* are journaled. To adjust the blocks, bolts e^4, e^5, having suitable heads by which they may be turned, pass through openings in the boxes, the former bearing on the upper side of the block, and the latter against the lower side, so that when set, said bolts hold the blocks firmly in their adjusted positions. Hanger plates e^3 are bolted to the inner face of the blocks e^2.

The blocks e^2 are channeled to receive the blocks e^1 so they will slide vertically. Journaled in the blocks e^2 are shafts *e* on which are mounted the chain carrying sprocket wheels E. Connected with the inner faces of the blocks e^2 and depending therefrom are plates e^3 which are adapted to lie closely to the inner sides of the floats and have secured to their lower ends the channel bars F. The shafts E may be connected respectively with any power transmitting device.

B represents generally my improved endless driving chain which is composed of a plurality of parallel flat links *b*, b^1, which are connected together and mounted on shafts *c* and *d*, said shafts passing through suitable openings in the ends of the links. On the outer end of the shafts *c* and *d* are rotatably mounted rollers b^2 and on the shafts *c* which alternate with the shafts *d* are fixed gears b^3. Surrounding the shafts *d* where they pass through the links *b* are collars b^4 which serve as journals for antifrictional bearings for said shafts and are adapted to fit loosely the forked ends e^6 of the sprocket wheels E. Similar collars b^8 are mounted on the shaft *c*. Rotatably mounted on the shaft *c* are collars c^1 formed with flanges in which are formed slots c^2. Passing through said slots are bolts c^3 which serve to secure the paddles C to said collars as shown in Figs. 4 and 5.

The paddles or blades C are preferably curved as shown and have fixed to their rear side near their lower edge lugs c^4 in which is pivotally secured a brace rod D which extends rearwardly and upwardly from the paddle and passes through a sleeve d^1 rotatably mounted on the chain shaft *d*. This sleeve is recessed to receive a coil spring d^3 which is adapted to receive the thrust of a set collar d^2 mounted on the rod D thus cushioning against the upper pressure of said

rod. On the outer end of the rod is a set collar d^5 which prevents the rod from sliding out of the sleeve d^1. The collar d^2 may be set at any position desired along the rod D thus permitting adjustability in the angle at which the paddles C are held when in operation. The slotted extensions on the collars c^1 permit adjustment of the paddles on the said collars and thus control the depth at which said paddles are held when in operation. Secured to the channel irons F are uprights b^6, b^7, the uprights b^6 having fixed on their upper ends rack bars b^5 which are in the path of the pinions b^3 The upper ends of the uprights b^7 are made rounded and are adapted to slidably support the rollers b^2 and thus prevent sagging of the chain at points between the sprocket wheels.

From the construction above described, it will be apparent that the various paddles on the chain may be so adjusted that they will extend into the water different depths thus presenting the maximum surface to the action of the current. In order to facilitate the turning of the paddles from the inoperative position which they automatically assume when on the upper side of sprocket-wheels, the rack b^5 will engage the pinions b^3 and by turning the latter will raise the paddles from their horizontal position to their normal operative position so that they will at once receive the impact of the current as soon as entering the stream. Through the adjustable blocks e^2 I am able to vary the degree of submergence of the paddles as a whole, and with them the channel guides F and the supporting standards b^6 and b^7 all of which are rigidly secured together.

It will be obvious that various modifications may be made in the details of construction of this apparatus without departure from the essential features of my invention which will be embodied in my claims.

It will also be apparent that this apparatus may be anchored in a stream where it will receive the impact of the current and convert it into power for driving any device or machine, or it may form a paddle wheel for a boat and be driven by the current when the boat is traveling in the direction of the current or by an engine on the boat when it is traveling against the current, in this latter case constituting a driven paddle wheel instead of a driving wheel.

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

1. In an apparatus of the class described, suitable supports, shafts adjustably mounted in said supports, sprocket wheels on said shafts, endless chains arranged to travel on said wheels, paddles adjustably and pivotally mounted on said chain, braces adjustably and pivotally connected with said chain and pivotally connected with said paddles, substantially as set forth.

2. An apparatus including suitable supports, shafts adjustably mounted in said supports, sprocket wheels on the shafts, endless chains arranged to travel on said wheels, paddles adjustably and pivotally mounted on said chain, braces adjustably and pivotally connected with said chain and pivotally connected with said paddles, cushioning means for receiving the end thrust of said braces, and means for feathering said paddles substantially in the manner and for the purpose described.

3. In an apparatus of the class described, supports, shafts adjustably mounted on said supports, sprocket wheels mounted on said shafts, endless chains arranged to travel on said wheels, said chains comprising links and cross bars connecting said links, collars rotatably mounted on said cross-bars, paddles adjustably secured to the alternate collars, braces pivotally secured to the intervening collars and pivotally connected with said paddles, cushioning means arranged in said brace collars and adapted to receive the thrust of said braces, and means for feathering said paddles substantially in the manner and for the purpose described.

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

ALFRED H. DAVIS.

Witnesses:
H. DELOS HIGMAN,
F. BENJAMIN.