No. 758,983. PATENTED MAY 3, 1904.

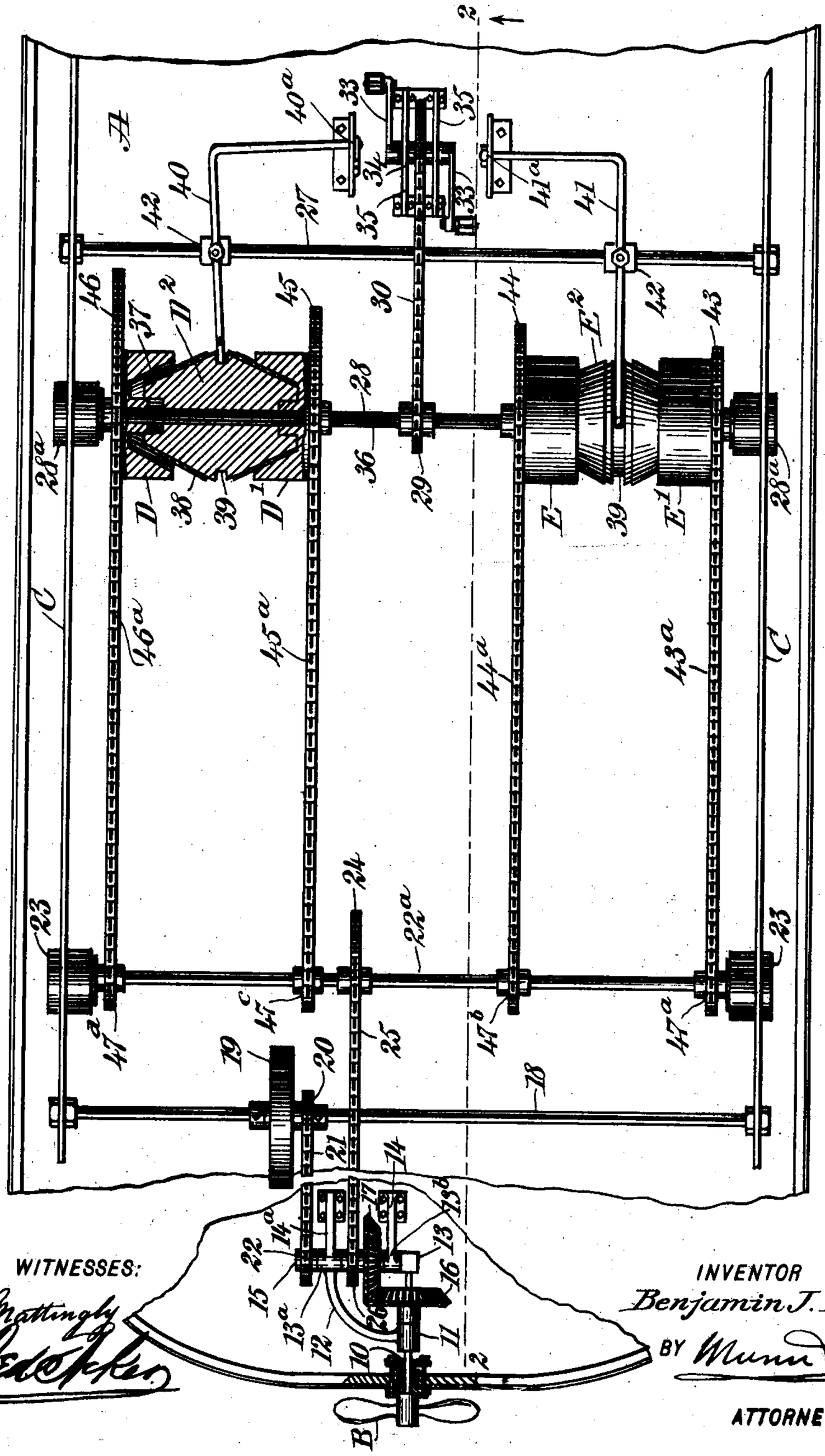
B. J. LAVIGN.

PROPELLING MECHANISM FOR BOATS.

APPLICATION FILED JULY 29, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.



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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 2.

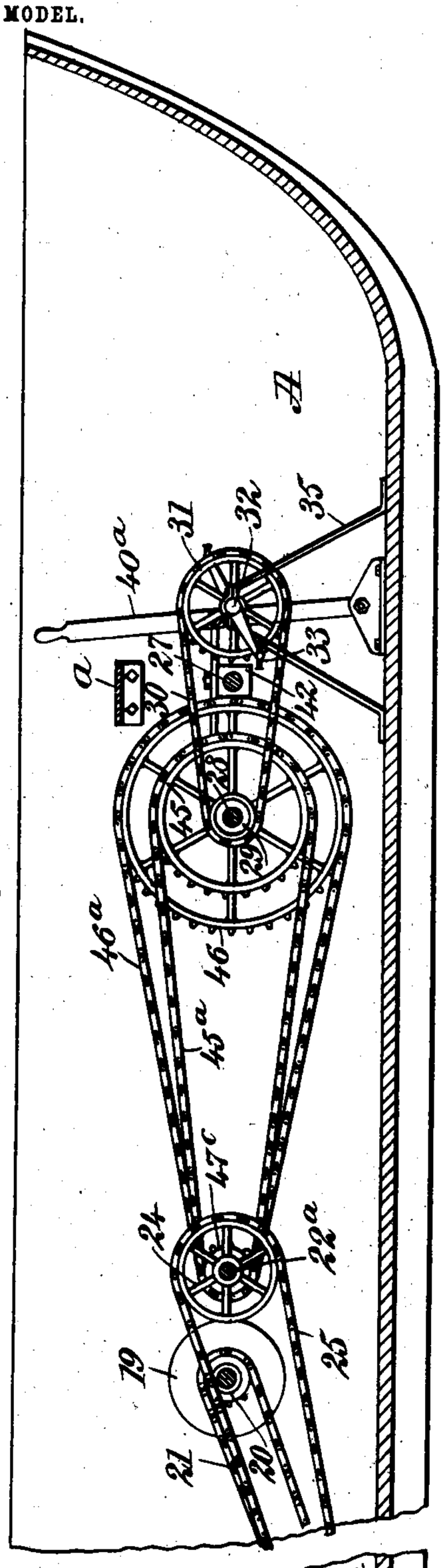
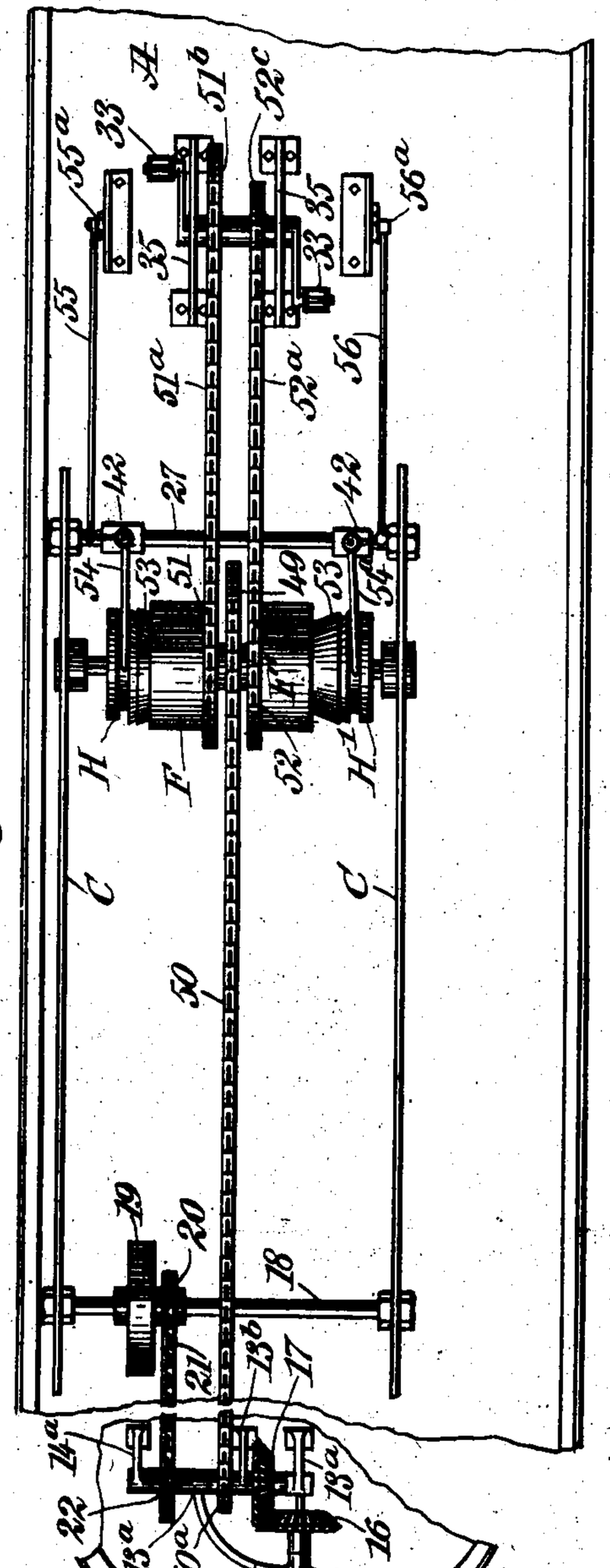
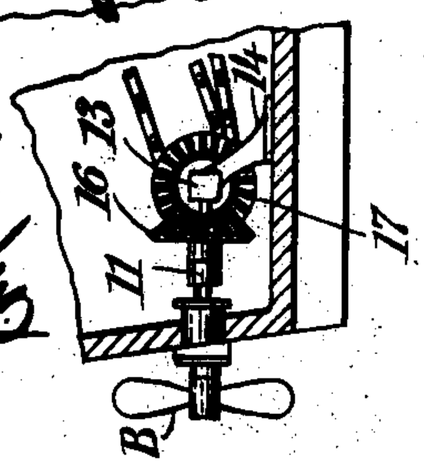


Fig. 3.





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No. 758,983. Patented May 3, 1904.

UNITED STATES PATENT OFFICE.

BENJAMIN J. LAVIGN, OF NEW YORK, N. Y.

PROPELLING MECHANISM FOR BOATS.

SPECIFICATION forming part of Letters Patent No. 758,983, dated May 3, 1904.

Application filed July 29, 1903. Serial No. 167,434. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN J. LAVIGN, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Propelling Mechanism for Boats, of which the following is a full, clear, and exact description.

The purpose of my invention is to provide a simple, economic, and effective propelling mechanism for boats, particularly of that character which is driven by foot or pedal power, and, further, to provide means whereby the speed of the mechanism may be increased or diminished, as desired, and in an expeditious and convenient manner under the full control of the operator.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claim.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of a portion of the boat and a sectional plan view of the propelling mechanism. Fig. 2 is a longitudinal section taken practically on the line 2 2 of Fig. 1, and Fig. 3 is a plan view of a portion of a boat and a single form of propelling mechanism.

A represents a portion of the hull of a boat, and B the propeller-blade, which is mounted on a shaft 10 in any suitable or approved manner, the said shaft being provided with proper bearings at the stern of the vessel. The propeller-shaft 10 intermediate of its ends is made to turn in a bearing 11, carried by an arm 12, projected from a second bearing 13^a, located near to the stern section of the boat, as is shown in Fig. 1, the bearing 13^a being supported by a suitable standard 14^a. The inner end of the propeller-shaft 10 is made to turn in a blind box 13, which is attached to a bearing 13^b opposite the end of the bearings 13^a above mentioned. This bearing 13^b is supported by a suitable standard 14, the standards 14 and 14^a being properly secured to the bottom of the boat. A short shaft 15 is held to turn in the bearings 13^a and 13^b, and the propeller-shaft 10 is provided near its inner end with a bevel-gear 16, meshing with a bevel-gear 17 on the shaft 15, as is shown in Figs. 1 and 2.

In front of the short or stern shaft 15 a rod 18 is located, which extends transversely of the hull and has its ends secured in side beams C, which constitute the frame for the propelling mechanism, together with the said rod 18 and other connecting-rods, such as may be desired. The side beams C are supported by attachment to the sides of the hull or by standards which extend upward from the bottom of the hull, as may be desired. On this rear connecting-rod 18 a balance or fly wheel 19 is loosely mounted, and a sprocket-pinion 20 is made integral with or is attached to the hub of the said fly-wheel, connected by a chain belt 21 with a sprocket-pinion 22 on the stern-shaft 15. The object of the fly-wheel 19 is to impart power to the propeller-shaft by reason of the momentum of the fly-wheel after the propelling mechanism has been set in operation.

In front of the connecting-rod 18 a driven shaft 22^a is mounted to turn in preferably ball-bearings 23, carried by the beams C on the said frame, and at or about the center of the driven shaft 22^a a sprocket-wheel 24 is secured, connected by a chain belt 25 with a second sprocket-pinion 26, secured on the stern-shaft 15. At the forward portion of the boat the side beams C are connected by another cross-bar 27, and between the two cross-bars 22^a and 27 and nearest the cross-bar 27 a drive-shaft 28 is mounted to turn in suitable roller-bearings 28^a, carried by the side beams of the frame.

Upon the central portion of the drive-shaft 28 a sprocket-pinion 29 is secured, connected by a chain belt 30 with a sprocket-wheel 31, secured upon a pedal-shaft 32, the pedal-shaft being provided with suitable pedals at its ends, and the pedal-shaft 32 is mounted to turn in suitable bearings 34, which are supported by standards 35, extending upward from the bottom of the boat. The drive-shaft 28 is provided with a longitudinal groove 36, and on this drive-shaft 28 clutch-sleeves are loosely

mounted, the said sleeves being in pairs, one pair of sleeves being designated as D and D′ and the other pair of sleeves as E and E′. These pairs of sleeves are located at each side of the center of the shaft 28. The clutch-sleeves have conical chambers 37 formed in their inner or opposing faces, as is shown in Fig. 1, and in connection with the clutch-sleeves D and D′ a clutch D^2 is employed, while in connection with the clutch-sleeves E and E′ a similar clutch E^2 is used. The clutches D^2 and E^2 have feathers to enter the groove in the drive-shaft 28, so that the clutches D^2 and E^2 turn with the drive-shaft and yet are capable of sliding thereon. These clutches D^2 and E^2 are made to taper in direction of their ends from a central point, as is also shown in Fig. 1, and the tapering end portions of the clutches are provided with a covering of leather or other substance which will effect a true frictional engagement between an end of a clutch and the wall of the chamber 37 of a clutch-sleeve in which the said end shall have been introduced.

Each clutch D^2 and E^2 is provided with a central peripheral groove 39, and the groove of the clutch D^2 receives the fork of a shifting-arm 40, while the groove on the clutch E^2 receives the fork of a second shifting-arm 41. Said arms are pivoted on blocks 42, which are firmly attached to the forward cross-bar 27 or which may be otherwise supported. The shifting-arms 40 and 41 are of angular construction, and their forward ends extend transversely of the hull in direction of each other, terminating one at each side of the pedal-shaft 32. The shifting-arm 40 is connected with a hand-lever 40^a, while the shifting-arm 41 is connected with a corresponding hand-lever 41^a, thus enabling the operator, for whom a seat *a* is provided, as shown in Fig. 2, to operate either clutch D^2 or E^2 and carry either clutch in engagement with either clutch-sleeve with which the clutch is adapted to coact.

The clutch-sleeve E′ is provided with an attached or integral sprocket-wheel 43 of any desired diameter, and the opposing clutch-sleeve E is provided with a larger sprocket-wheel 44, while the clutch-sleeve D′ has a still larger sprocket-wheel 45 forming a portion thereof, and a yet larger sprocket-wheel 46 is carried by the clutch-sleeve D.

On the driven shaft 22^a a series of sprocket-pinions is secured, preferably four in number. The said sprocket-pinions are designated, respectively, as 47^a, 47^b, 47^c, and 47^d, as is shown in Fig. 1. A sprocket-chain 43^a connects the sprocket-wheel 43 of the clutch-sleeve E′ with the sprocket-pinion 47^a, a second chain belt 44^a connects the sprocket-wheel 44 of the clutch-sleeve E with the sprocket-pinion 47^b, the sprocket-wheel 45 on the clutch-sleeve D′ is connected by a chain belt 45^a with the sprocket-pinion 47^c, and the largest sprocket-wheel 46 is connected with the sprocket-pinion 47^d by a chain belt 46^a. It will thus be observed that the speed at which the propeller shall turn is at the option of the operator, as by bringing the clutch E^2 in engagement with the clutch-sleeve E′ the slowest speed is obtained. A greater speed may be secured by shifting the clutch E^2 in engagement with the clutch-sleeve E. A still greater speed may be attained by bringing the clutch D^2 in frictional engagement with the clutch-sleeve D′, as is shown in Fig. 1, while the greatest possible speed is obtainable by shifting the clutch D^2 to an engagement with the clutch-sleeve D. When one of the clutches is in action at either end, the other clutch occupies a central position between the clutch-sleeves in connection with which it operates, being at such time out of frictional engagement with both of the sleeves.

It will be observed that this mechanism is exceedingly simple and durable and is capable of imparting very high speed to the propeller-shaft and at any time that the operator may desire the speed may be increased or decreased within the limits of the sprocket-wheels 43 and 46.

In Fig. 3 I have illustrated what I term a "single" form of the propelling mechanism, which enables said mechanism to be made very light and renders it applicable to small boats. The difference in construction resides only in the arrangement of the clutch and clutch-sleeves and in the connections between the drive-shafts and the stern and pedal shafts. Under the construction shown in Fig. 3 two clutch-sleeves F and F′ are loosely mounted on the drive-shaft 28, each clutch-sleeve having a conical chamber at its outer end surface, and in connection with each clutch-sleeve F and F′ a clutch is employed, the clutches being designated, respectively, as H and H′. These clutches have conical sections adapted to enter the conical chambers in the clutch-sleeves, and the conical portions of the clutches are covered with leather 53 or other material adapted to add to the frictional contact of a clutch and clutch-sleeve when brought together. The clutch-sleeves run loose on the shaft 28; but the clutches are feathered on the shaft, yet have sliding movement. A sprocket-wheel 49 is secured on the drive-shaft 28 between the two clutch-sleeves, connected by a chain belt 50 with a sprocket-pinion 50^a on the stern-shaft 15. The clutch-sleeve F is provided with a sprocket-wheel 51, and the clutch-sleeve F′ has a similar sprocket-wheel 52, the two sprocket-wheels being usually of the same diameter. The sprocket-wheel 51 is connected by a chain belt 51^a with a sprocket-wheel 51^b on the pedal-shaft 32, while the sprocket-wheel 52 is connected by a chain belt 52^a with a smaller sprocket-pinion 52^c, also located on the said pedal-shaft. When either clutch-sleeve is to be driven, the corresponding clutch

is brought in engagement with the sleeve, and when a clutch is in engagement with one sleeve the opposing clutch is out of engagement with the opposing sleeve. Under this construction it will be observed that a slow speed and a high speed is obtainable. Under the slow speed the drive-shaft will move slower than the movement of the pedals and pedal-shaft, and when the mechanism for high speed is brought into play the drive-shaft 28 will have a quicker movement than that of the pedals or the pedal-shaft. Angular shifting-arms 54 and 54ª are respectively employed for the clutches H and H′, and these shifting-arms 54 and 54ª are mounted on the blocks 42 on the front cross-bar 27, heretofore referred to. The shifting-arm 54 is connected by a link 55 with a hand-lever 55ª, while the shifting-arm 54ª is connected by a link 56 with a second hand-lever 56ª.

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

In a propelling mechanism for boats, a drive-shaft, sleeves mounted loosely on the drive-shaft, having conical chambers, sprocket-wheels of different diameters carried by the said sleeves, a clutch mounted to slide on the drive-shaft and turn therewith, having conical ends adapted to enter the conical chambers in the clutch-sleeves, a shifting device for the clutch, a pedal-shaft, a driving connection between the pedal-shaft and the main shaft, a driven shaft, belt connections between the driven shaft and the sprocket-wheels on the said clutch-sleeves, a propeller-shaft, a driving connection between the driven shaft and the propeller-shaft, a fixed bar, a fly-wheel loosely mounted on the said bar, a stern-shaft in gear with the propeller-shaft, and a sprocket-and-chain connection between the stern-shaft and the fly-wheel, for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

BENJAMIN J. LAVIGN.

Witnesses:

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AARON B. LEVINSKY.