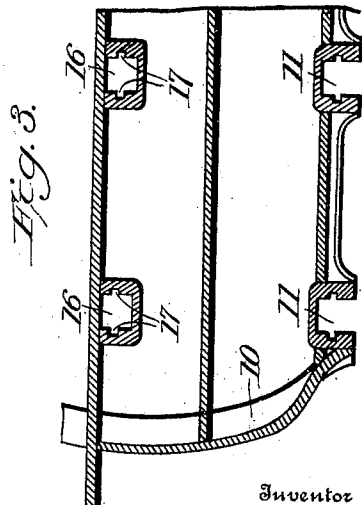
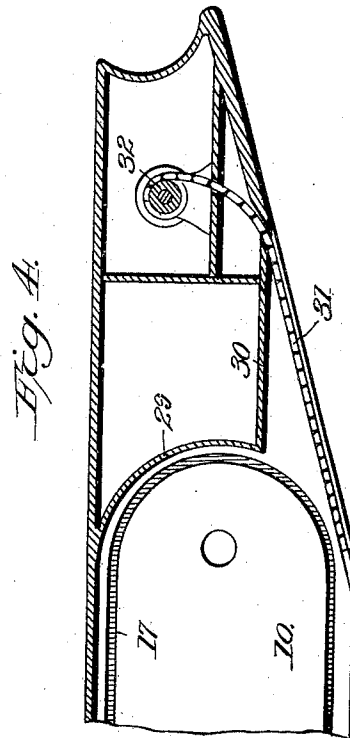
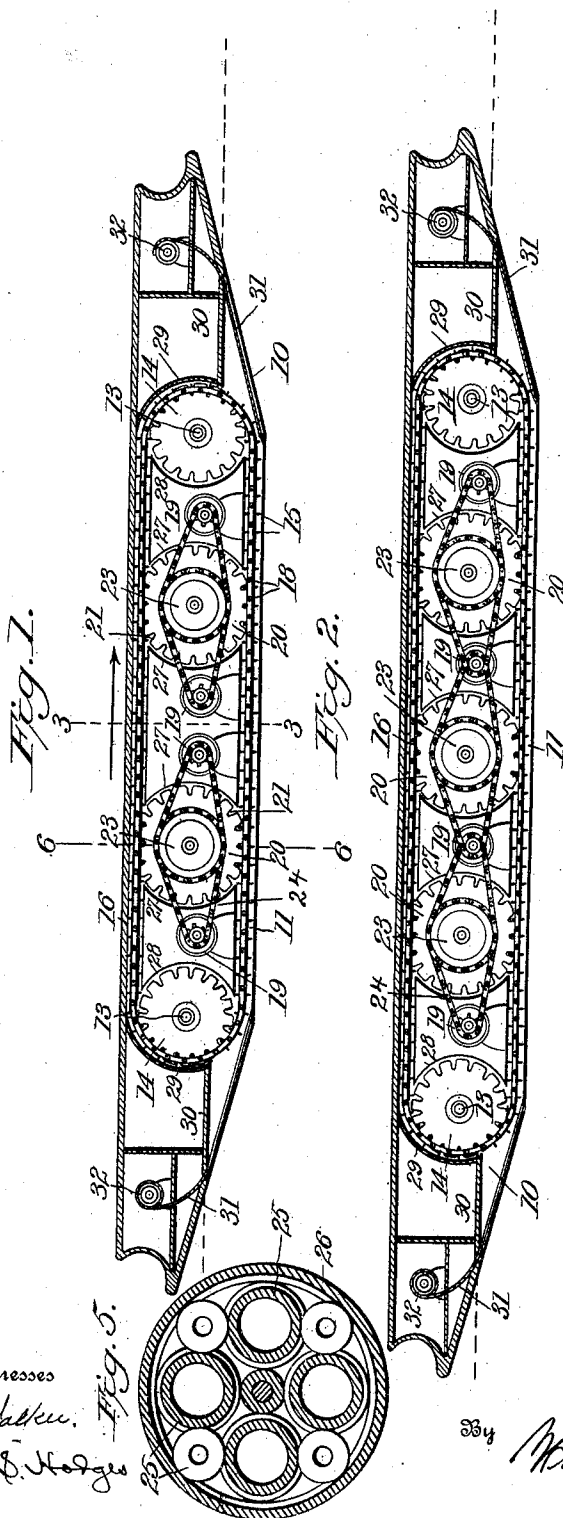


L. DION.
PLURAL DRIVE MECHANISM FOR MARINE PROPULSION.
APPLICATION FILED OCT. 20, 1905.

976,642.

Patented Nov. 22, 1910.

2 SHEETS-SHEET 1.



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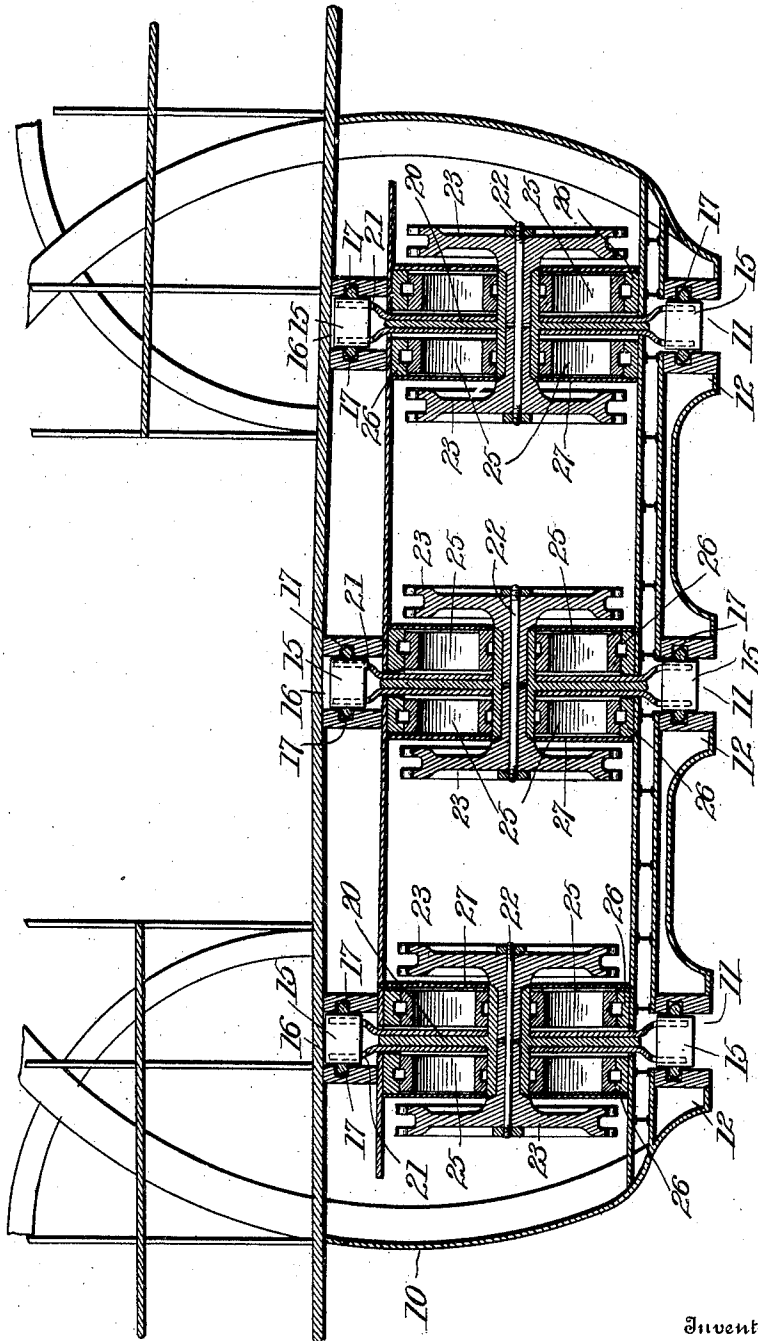
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Fig. 6.



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UNITED STATES PATENT OFFICE.

LÉON DION, OF WILKES-BARRE, PENNSYLVANIA.

PLURAL DRIVE MECHANISM FOR MARINE PROPULSION.

976,642.

Specification of Letters Patent.

Patented Nov. 22, 1910.

Application filed October 20, 1905. Serial No. 283,675.

To all whom it may concern:

Be it known that I, LÉON DION, of Wilkes-Barre, in the county of Luzerne and State of Pennsylvania, have invented certain new and useful Improvements in Plural Drive Mechanism for Marine Propulsion, of which the following is a specification.

This invention relates to the propulsion of navigable vessels, and particularly to that type employing an endless series or chain of paddles passing over supporting and driving drums and having the lower stretch of the endless series or chain immersed in the water while the upper or return stretch is above the surface of the water. When such mechanism is employed it is desirable, in order to get the best effect from the action of the paddles upon the water, to have the drums or wheels at the ends of the endless series at a considerable distance apart so that the series, as a whole may be a long one. If great power is applied, the strain upon the paddle sections becomes very great, and is liable to break or "buckle" the series.

One of the objects of the present invention is to provide what may be termed "helper" drums or wheels engaging the endless series of paddles at a point or points intermediate the end drums or wheels, and apply the driving force to these intermediate or "helper" drums either solely, or in addition to power applied to the end drums or wheels.

Another object of the invention is to provide intermediate or "helper" drums or wheels of the character described, so formed that they will slip easily through the water, exerting little or no downward or upward force upon the water as they enter and leave it.

To these ends, the invention consists in the construction and combination of parts substantially as hereinafter described and claimed.

Of the accompanying drawings:—Figure 1 represents a longitudinal section through a vessel having my invention, in one of its embodiments, applied thereto. Fig. 2 is a view similar to Fig. 1 but showing three intermediate or "helper" drums instead of two. Fig. 3 represents a detail section on line 3—3 of Fig. 1, the series of paddles being omitted. Fig. 4 is a detail view similar to the right-hand end of Fig. 1, but on a larger scale, the end drum and the series

of buckets being omitted. Fig. 5 represents a detail section through the hub and roller bearings of one of the intermediate drums. Fig. 6 represents a section on line 6—6 of Fig. 1, on a larger scale, and representing some of the superstructure of the vessel.

Similar reference characters indicate the same or similar parts in all the views.

The hull of the vessel is represented at 10, and said vessel may be of any preferred shape having a channel or channels 11 extending longitudinally of its bottom. In Fig. 6 I have represented three such channels, and in Figs. 1 and 2 I have shown a form of hull of the "double-end" type described more fully in another application filed by me October 20, 1905, Serial Number 283,676.

The superstructure of the vessel may be either of such form as I have illustrated somewhat conventionally in Fig. 6, or it may be otherwise constructed. In said Fig. 6, the vessel is shown as provided with three parallel keels 12 each of which is formed with a channel 11. It is to be understood that the present invention may be equally as well applied to a vessel having one keel and one channel therein. In the following description, I shall refer to the plural drive mechanism used in connection with one channel, with the understanding that the same will apply equally to the mechanism used in connection with the other channels.

Near each end of the channel 11, and above the same, is a shaft 13 mounted in suitable bearings, not shown, and on each shaft 13 is mounted a drum or wheel 14 having suitable recesses or pockets to receive the paddles 15 comprising an endless series suitably jointed together to form what may be termed an endless belt or chain of paddles, the lower stretch of the same extending along the channels 11, and the upper stretch extending along a straight upper chute or guideway 16. The sides of the channel 11 and chute or guideway 16 are formed with grooves 17 in which studs 18 projecting from the paddle sections run to prevent the upper and lower stretches of the series of paddle sections from sagging. Suitably supported in the hold of the vessel are motors or engines 19 of any preferred type, preferably rotary engines.

Between the drums 14, and in tandem

series therewith, are two or more drive wheels 20. In Fig. 1 I show two of such drive wheels and in Fig. 2, three of them. Each of these drive wheels comprises preferably two disks of steel or other suitable metal bolted or riveted together and having their peripheral portions somewhat spread or separated from each other and formed with recesses 21 which receive and engage the paddles 15. Each drive wheel 20 is secured to a shaft 22, the latter having secured to each end a sprocket wheel 23 which is driven by a sprocket chain 24 by one or more of the motors or engines 19. In the drawings I have shown each chain 24 as driven by two motors. Suitable antifriction bearings are provided for the shafts 22, said antifriction bearings comprising rollers interposed between the shafts 22 and annular races or bearing rings 26 suitable secured in the hold of the vessel.

It will now be understood that by having a plurality of drive wheels intermediate the end drums or guide wheels for the endless series of paddles, the power is distributed, each drive wheel helping the other or others, and reducing to the minimum the risk of breaking or buckling the series when great power is applied. And owing to the fact that the drive wheels are composed of thin notched disks, they will not take hold of the water when entering or leaving it, so as to lose power by forcing it down or throwing it up. And the larger roller bearings, of a diameter as a whole nearly equaling the diameter of the drive wheels, give great steadiness as well as ease of movement to the latter.

All of the wheels are incased at all points excepting where it is necessary to provide for the passage of the endless series of paddles. Each side of each drive wheel is protected by a curved shield 27, and a similar curved shield 28 is arranged close to the inner periphery of each drum or wheel 14. The spaces between the shields, and above the top of the channel 11 and the bottom of the chute or guideway 16, may be utilized for the motors or parts of them.

On the outer side of each drum 14, and at a distance therefrom to permit the passage of the buckets is a curved shield or wall 29 extending down to a deck or flooring 30 along about normal load-water-line of the vessel, said flooring 30 constituting the roof of the end of the channel 11. This practically constitutes a greater height of the channel 11 opposite each end of the endless series of paddles. The open bottom of the channel below each flooring 30 may be closed by a sliding platform 31 which, as illustrated in the drawings, may consist of a series of slats jointed together and having their ends sliding in suitable guides inclined from the end of the vessel downward to a

point under the drum 14. The flexible platform or shield so constructed may be wound on a suitable reel 32 so as to entirely open the portion of the channel under the elevated partition 30 which divides or separates the end of the channel from the interior of the vessel.

When the vessel is traveling in the direction of the arrow in Fig. 1, the sliding shield 31 is lowered to the position shown at the right of said figure, that end of the vessel being then the bow, and the other shield will be raised. Therefore, when the paddles are started, the water between the partition 30 and shield 31 will almost immediately be exhausted, after which the paddles encounter little or no resistance when moving downward under the front drum 14. The raised shield 31 at the stern permits the water to escape freely. When the vessel is to be propelled in the opposite direction, the relative positions of the two shields 31 will be reversed. Suitable rudders at the ends of the vessel will be employed of course. I do not claim herein the sliding platforms or shields, as the same form the subject matter of another application filed by me October 20, 1905, Serial Number 283,676.

I do not limit myself to the details of construction here shown, and may variously modify the same without departing from the spirit of the invention. For instance, while I show, in Fig. 6, three keels 12, each having a channel 11, there may be any number of the same according to the width or beam of the vessel, and some of the keels may be unprovided with channels.

Having now described my invention, I claim:—

1. A navigable vessel having free-running end drums and an endless series of paddles mounted thereon, a plurality of drive-wheels intermediate said drums and engaged with said endless series of paddles, motors for actuating said drive-wheels, compartments being provided between the drums and drive wheels, and means for guiding the paddles between the drums and drive-wheels.

2. A navigable vessel having free-running end drums and an endless series of paddles mounted thereon, a plurality of drive-wheels intermediate said drums and engaged with said endless series of paddles, the said drums and wheels having casings or shields, openings being formed for the passage of the paddles to engage said drums and wheels, motors for actuating said drive-wheels, and means for guiding the paddles between the drums and drive-wheels.

3. A navigable vessel having free-running end drums and an endless series of paddles mounted thereon, a plurality of drive-wheels intermediate said drums and

engaged with said endless series of paddles, compartments being provided between the drums and drive wheels, the said drive-wheels being composed of thin disks periph-
5 erally notched to engage the paddles, motors for actuating said drive-wheels, and means for guiding the paddles between the drums and drive-wheels.

4. A navigable vessel having free-run-
10 ning end drums, an endless series of paddles mounted thereon, a plurality of drive-wheels intermediate said drums and formed to en-
gage the paddles, compartments being pro-
vided between the drums and drive wheels,
15 shafts carrying said drive-wheels, independ-ent motors for actuating said shafts and drive-wheels, bearing rings, antifriction rollers between said shafts and bearing

rings, and means for guiding the paddles between the drums and drive-wheels. 20

5. A navigable vessel having free-run-
ning end drums, an endless series of pad-
dles mounted thereon, a plurality of drive-
wheels intermediate said drums and formed
to engage the paddles, compartments being 25
provided between the drums and drive
wheels, a plurality of independent motors
for actuating each of said drive-wheels, and
means for guiding the paddles between the
drum and drive-wheels. 30

In testimony whereof I have affixed my
signature, in presence of two witnesses.

LÉON DION.

Witnesses:

A. W. HARRISON,
Wm. S. HODGES.