T. S. MILLER.

MARINE TRANSFER.

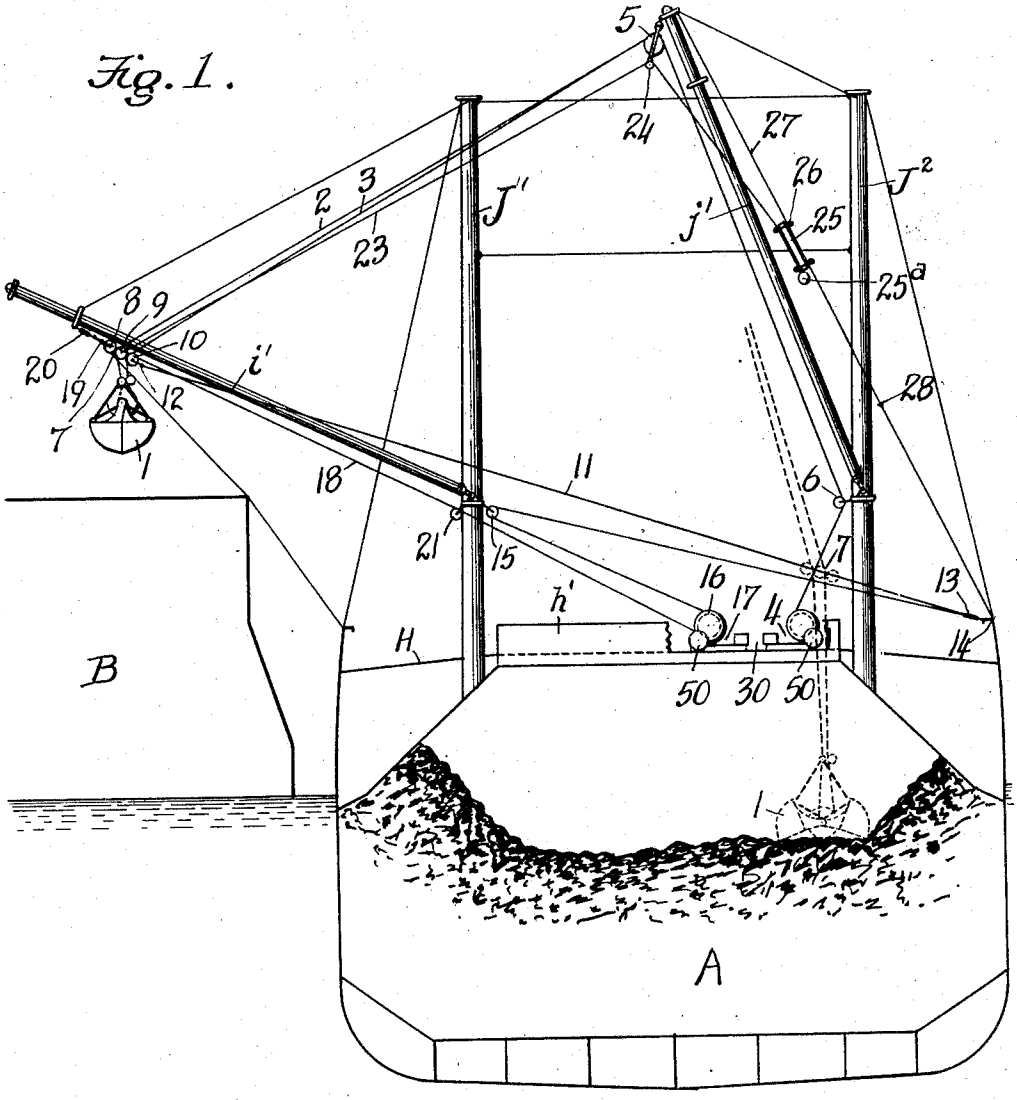
APPLICATION FILED MAR. 5, 1909.

1,015,240.

Patented Jan. 16, 1912.

4 SHEETS—SHEET 1.

Fig. 1.



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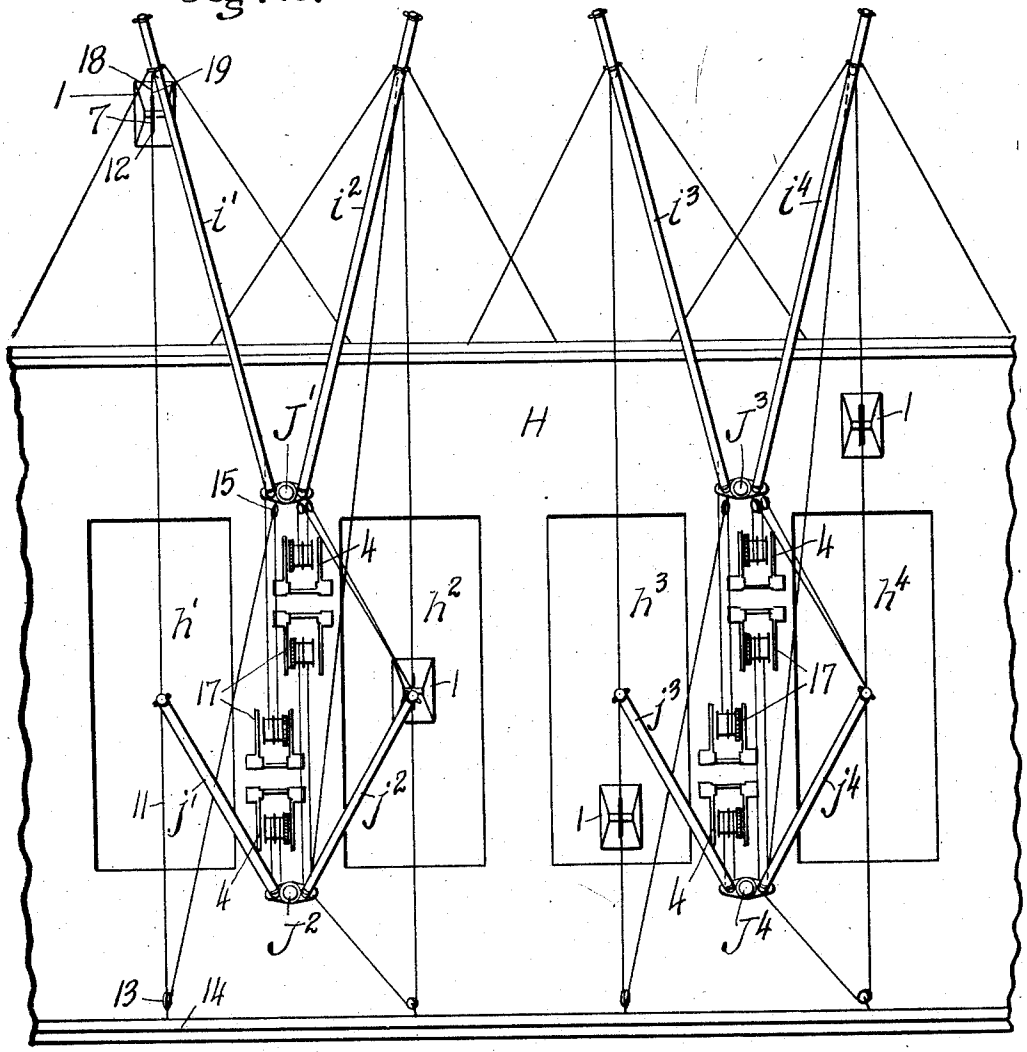
4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

Fig. 3.

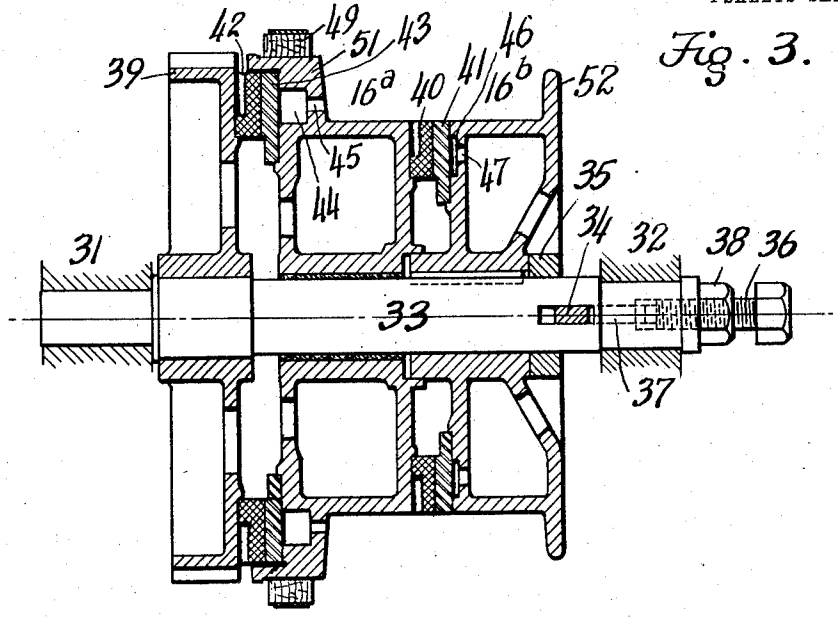


Fig. 6.

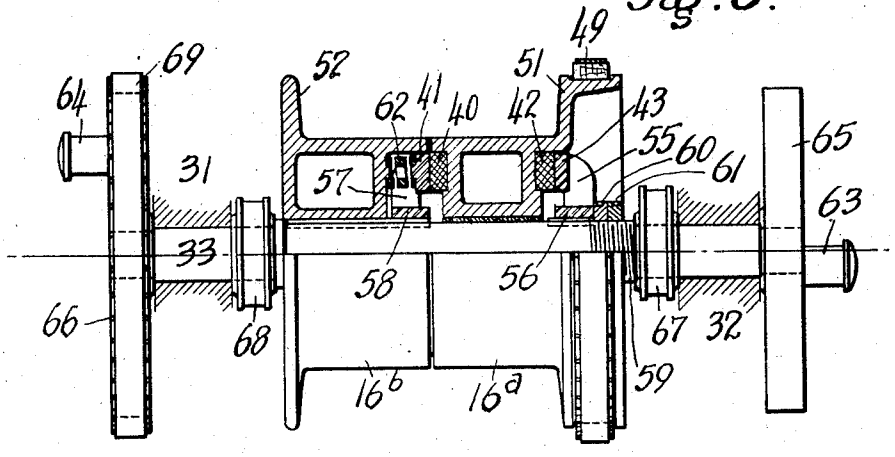
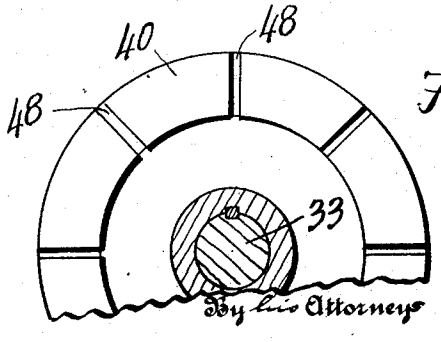


Fig. 7.



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4 SHEETS—SHEET 4.

Fig. 5.

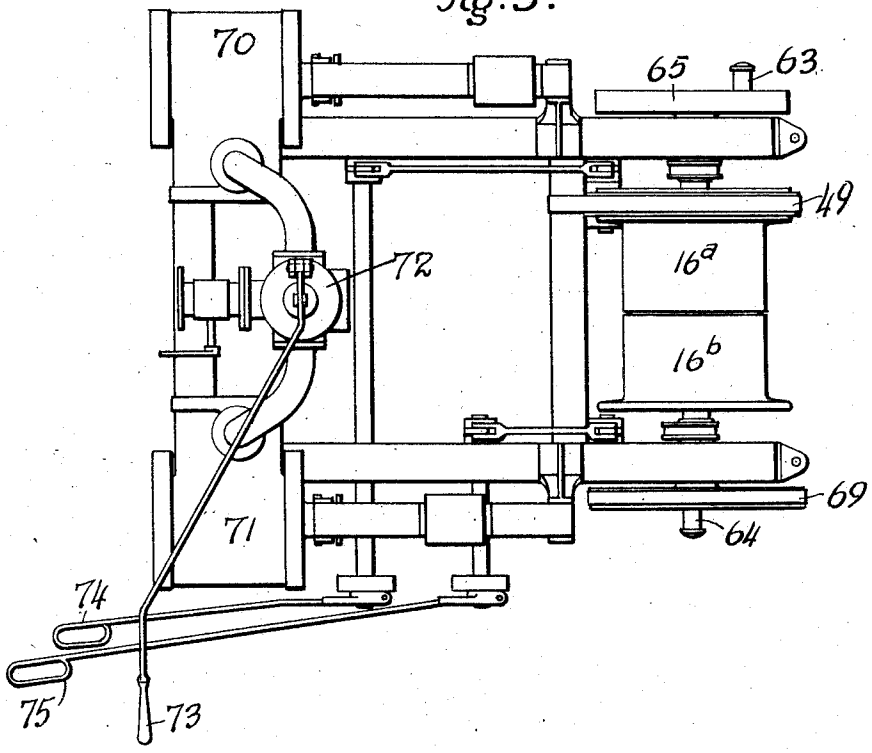
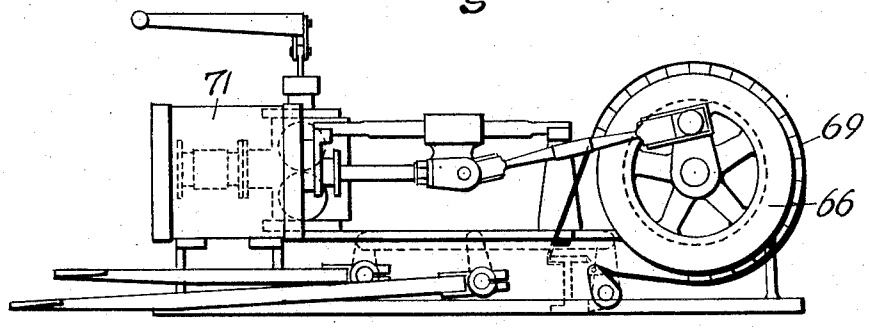


Fig. 4.



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UNITED STATES PATENT OFFICE.

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MARINE TRANSFER.

1,015,240. Specification of Letters Patent. Patented Jan. 16, 1912.

Application filed March 5, 1909. Serial No. 481,450.

To all whom it may concern:

Be it known that I, THOMAS SPENCER MILLER, a citizen of the United States, and a resident of South Orange, county of Essex, and State of New Jersey, have invented a new and useful Improvement in Marine Transfers, of which the following is a specification.

In my application No. 186552 filed December 26, 1903, I have shown a marine transfer containing many generic features retained by my present construction.

In the accompanying drawings, Figure 1 is a cross section of a collier containing my present invention. Fig. 2 is a plan of a section thereof. Fig. 3 is a longitudinal section of either the rope drum 16, or 4, which are of identical construction. Fig. 4 is an elevation of another form of rope drum engine which may be used at 4 or 17. Fig. 5 is a plan of the same. Fig. 6 is a longitudinal section of the drum thereof. Fig. 7 is a fragmentary view of the friction ring with the radial spaces.

Either of the forms of rope drum engines and those portions of my invention contained therein may be used in other combinations than the marine transfer shown in Figs. 1 and 2.

A is the collier and B, a warship alongside taking coal therefrom. The hull of this collier will preferably be divided into compartments by water-tight partitions as described in said application and will be provided with its own propelling apparatus.

H is the deck provided with the hatchways h', h^2, h^3, h^4.

J', J^2 are a pair of masts located adjacent the corners of the hatchways h', h^2 and J^3, J^4 are another pair of masts located adjacent the corners of the hatchways h^3, h^4.

j', j^2 are booms extending from the mast J^2 to points above the centers of the hatchways h', h^2 at an elevation above the ordinary boat equipment.

j^3, j^4 are corresponding booms extending from the mast J^4 above the hatchways h^3 and h^4, respectively.

i', i^2 are booms extending from the mast J' outboard to points respectively opposite the centers of the hatchways h' and h^2.

i^3 and i^4 are booms extending from the mast J^3 outboard to points respectively opposite the centers of the hatchways h^3, h^4.

Since a duplicate apparatus coöperates with each hatchway, it will suffice to describe the apparatus coöperating with the hatchway h'.

1 is a self-loading clam-shell bucket operated by the ropes 2, 3, actuated by the rope drum engine 4 hereinafter more particularly described.

5 is a pulley block over which the ropes 2, 3, pass at the top of the boom j'. 6 is a guide-sheave for said ropes at the opposite end of said boom.

The bucket operating ropes run to different parts 16^a and 16^b of the drum 4, but are wound thereon in the same direction so that when the drum parts move together the two ropes are paid out or hauled in in unison.

7 is a swinger frame containing the sheaves 8, 9 and 10 between each two of which the ropes 2 and 3, respectively, pass.

11 is an inhaul swinger rope fast at 12 to one end of the swinger frame and extending thence in a downwardly inclined direction transversely across the center of the hatchway to the sheave 13 attached to the rail of the ship at 14, thence diagonally to the guide-sheave 15 fast to the mast J' and thence to the part 16^a of the rope drum 16 of the rope drum engine 17, to which drum part its end is made fast. 18 is an outhaul-swinger rope fast at 19 to the opposite end of the swinger frame and extending over a sheave 20 fast at the outer end of the boom i', thence diagonally over the sheave 21 at the opposite end of the boom i' to part 16^b of drum 16 of the rope drum engine 17, to which drum part its end is made fast. The inhaul and outhaul ropes are wound inversely on the drum parts 16^a, 16^b so that as one is hauled in the other is paid out in consonance therewith.

The runs of the inhaul and outhaul swinger ropes 11 and 18 between the sheaves 13 and 20 carry the swinger frame 7 from the position shown in dotted lines to the position shown in full lines in Fig. 1, passing transversely over the center of the hatchway and thence outboard to the outer end of the mast i' above the hatchway of the warship.

To better maintain the control of the swinger frame 7, I provide a suspension rope 23 secured about the center of gravity of the swinger frame and extending thence approximately parallel with the ropes 2 and 3 over the sheave 24 on the pulley-block 5 and thence down to a counterweight 25 mounted

on a traveler 26 running on the inclined rope 27 stretched between the ship rail 14 and the end of the boom *j'*. 28 is a stop on the rope 27 fixing the downward extremity of traveler movement. As the swinger frame is hauled forward or backward by the outhaul or inhaul rope, this suspender rope and its counterweight will maintain a constant lift on the swinger frame whereby it will be caused to run straight and true with a minimum of vibration. Furthermore, the suspender rope, instead of being made fast to the counterweight 25, extends through and beyond it and is made fast to the supplemental counterweight 25^a. Therefore, when the swinger frame reaches a point where the counterweight 25 rests on the stop 28 (which will be when the swinger frame is over the hatchway and when its uncounterbalanced weight is an advantage toward maintaining its normal position) the further descent of the supplemental counterweight 25^a will take any slack out of the suspender rope.

I will next describe the rope drum engine shown at 4 and 17. These are alike and a description of one will answer for both. They are placed inversely as shown in Fig. 1, so that a single operator standing on the deck at 30, between them can at the same time reach and operate the controlling levers of both.

31 and 32 are the bearings in the frame for the shaft 33. The rope drum parts 16^a and 16^b are respectively loose upon the shaft and splined thereto.

34 is a cross key extending through a slot in the shaft bearing against a collar 35, which in turn bears against the end of the hub of the splined drum part 16^b.

36 is a set screw threaded into the end of the shaft and thrusting against the cross key 34 through the pin 37.

38 is a lock nut.

39 is the spur wheel fast on the shaft, which meshes with a pinion on the engine crank-shaft.

By adjusting the set screw 36 the drum part 16^b is forced toward the drum part 16^a and this in turn is forced toward the spur wheel 39. To provide the friction surfaces which, under the adjusted thrust of the set screw 36, transmit the power from the spur wheel to the drum part 16^a, and thence in turn to the drum part 16^b, I make the following provision: Between the drum parts 16^a and 16^b is the friction ring 40 composed of an alloy of soft cast-iron and steel and also the friction ring 41 composed of cast steel. These rings are fast, respectively, to the drum parts 16^a and 16^b. Between the drum part 16^a and the spur wheel 39 is the friction ring 42 of an alloy of soft cast-iron and steel and the friction ring 43 of cast steel, being fast, respectively, to the spur wheel and the drum part 16^a. Behind the friction ring 43 the flange of the drum is provided with an annular air space 44 ventilated by a series of holes 45. The air entering the annular passage 44 through these holes comes directly in contact with the rear of the friction ring 43 opposite the friction surface and keeps it cool. A corresponding annular passage 46 and ventilating holes 47 are provided in the body of the drum part 16^b at the back of the friction ring 41 for the cooling thereof. The friction rings 40 and 42 are both made in sections, as shown in detail in Fig. 7, the various sections being separated by radial spaces 48 connecting at both ends with the open air so as to provide a free circulation of air for cooling the sections. These friction rings are described and fully covered in my Patent No. 715111, Dec. 2, 1902. 49 is an ordinary band brake operating upon the flange of the drum part 16^a and, if need be, there may be another band brake operating upon the flange of the crank wheel 50.

The drum parts 16^a and 16^b and the friction rings 40 and 41 are preferably made of equal diameter, so that an undivided drum surface will be presented between the end flanges.

The engine 4 for controlling the bucket is operated as follows: The set screw 36 is so adjusted that the pressure between the friction surfaces is just sufficient to take up the slack in holding rope 2 wound on drum part 16^a; the two drum parts moving in unison with the spur wheel, excepting when an excessive rope pull occurs on drum part 16^a and when the band brake 49 is applied, at which times the friction surfaces will slip. The engine is reversible. The operator controls the engine so as to pay out upon both ropes 2 and 3, with the brake 49 unset, until the bucket nearly reaches the coal or cargo. He then, through a foot lever, sets the brake 49 which will arrest the drum part 16^a and the holding rope 2 secured thereto and cause the blades of the bucket to open. He then releases the brake and the further motion of the engine lowers the bucket onto the pile. He now reverses the engine which winds up closing rope 3 on drum part 16^b and the motion of drum part 16^b being arrested by excessive pull closes the bucket. When the bucket is closed, drum part 16^b will continue to wind up rope 3 and the bucket is hoisted to the height desired. When the bucket has been swung to the delivery point the operator sets the brake and the bucket opens so as to dump its load. In the normal operation of this engine it will be necessary to use one lever for the steam reverse valve and one for the brake 49 on the loose drum. Occasionally a brake may be required on the crank disk. This is added for occasional use but not for regular use. Thus, when the bucket has been raised

up to the swinger frame the steam may be shut off and the brake applied to the crank disk 50. The operator can then, by the use of this brake, give sufficient slack to enable the swinger frame to swing the bucket to its outward position.

The swinger engine is operated as follows: Assume that the outhaul swinger rope is fast to the drum part 16^a and the inhaul swinger rope fast to the drum part 16^b. By reversing the engine the operator can swing the bucket in or out as though the inhaul and outhaul ropes were an endless rope connected with a single drum. He is enabled to keep them taut by the application of the brake 49 to cause a differential movement between the drum parts 16^a and 16^b and thus take up any slack that may occur. Set screw 36 on the swinger engine is so adjusted that the pressure between the friction surfaces is sufficient to swing the loaded bucket to its extreme outboard position; that is to say, it is considerably greater than the bucket engine. When the swinger frame reaches the end of the swing in either direction the steam may be shut off and the frame held in that position by the application of the brake 49. It will thus be seen that (the brake on the crank shaft being unnecessary for regular use) I have provided a two-part drum upon a single shaft operated by two levers (the steam lever and the brake lever) which will open, close, raise, lower and permit the swing of the bucket at the will of the operator, and I have also provided a similar engine by which the same operator, standing in the same position, can, at the same time control the swing; there being altogether only four levers essential for the attention of the operator and generally only three requiring his attention, because on the swinger engine the brake lever would only be required in the event that the operator desired to take up the slack or to shut off his steam at the end of a swing. The engine shown in Figs. 4, 5 and 6 presents a further very important invention, adding to the simplicity, economy and smallness of space required. In this construction there is a loose drum part 16^a, the splined drum part 16^b, the end flanges 51 and 52, the brake 49 and the shaft 33 with its bearings 31 and 32 as before. There are also the friction surfaces composed of the pair of friction rings 40, 41 and the pair of friction rings 42, 43. In this case, however, the spur wheel is dispensed with and in lieu thereof one of the rings 42 or 43 is fixed to a spider 55, the hub 56 of which is splined to the shaft. Also in lieu of having one of the rings 40 or 41 fixed to the drum part 16^b, it is fixed to a spider 57, the hub 58 of which is splined to the shaft. In this case the drum part 16^b may be keyed fast to the shaft.

To produce the endwise thrust I cut a thread 59 directly on the shaft and thread thereto a nut 60 and a lock nut 61. By setting up these nuts the spider 55 binds the drum part 16^a toward the drum part 16^b so as to produce the requisite pressure between the friction surfaces. That this pressure may be yielding, I prefer to interpose the coiled springs 62 between the spider 57 of the drum part 16^b. These springs also permit of the expansion of the parts under heat and maintain the friction pressure substantially constant under variations from heat. However, these coiled springs may, if desired, be dispensed with and also the spider 62, the friction ring 41 being, under those circumstances, made fast to the drum part 16^b.

In the engine shown in Figs. 4, 5 and 6 the cranks 63, 64 and crank disks 65, 66 and eccentrics 67, 68 are mounted directly on the drum shaft 33, and the additional brake 69 for occasional use is applied to the crank disk 66. The cylinders 70 and 71 are made of very large bore sufficient to maintain the requisite pull in hoisting and swinging without the introduction of gearing, shafts and bearings. The brake 69 upon the crank disk or fly wheel 66 controls the drum 16^b that is keyed to the shaft while the loose drum 16^a is controlled by the brake 49 acting directly upon it. The steam reverse valve 72 is of well known construction and is operated by hand lever 73. Lever 73 together with foot-lever 74 for operating brake 49 and foot lever 75 for operating brake 69 are arranged in the most convenient position for the operator.

The construction of the rope drum shown and described herein is only claimed in this application in so far as it enters in combination with the other parts of the system, and the structure of this rope drum in itself is made the subject-matter of a division of this application filed January 12, 1910, Serial No. 537,656.

Having thus described my invention, what I claim is:

1. In a marine transfer, in combination, a boat containing a hatchway, a pair of masts, a boom extending from one of the masts to a point above the hatchway, a hoisting rope sheave thereon, a second boom extending outboard from the other mast, an outhaul swinger rope sheave thereon, the swinger frame, the hoisting rope extending therethrough, the outhaul and inhaul swinger ropes and means for actuating the same.

2. In a marine transfer, in combination, a boat containing a hatchway, a pair of masts, a boom extending from one of the masts to a point above the hatchway, a hoisting rope sheave thereon, a second boom extending outboard from the other mast, an outhaul swinger rope sheave thereon, the swinger frame, the hoisting rope extending there-

through, the outhaul and inhaul swinger ropes and means for actuating the same and a suspender rope.

3. In a marine transfer, in combination, a boat having a hatchway, a hoisting rope sheave above the hatchway, inhaul and outhaul swinger rope sheaves, the swinger frame, the hoisting rope extending therethrough, the outhaul and inhaul swinger ropes, means for actuating the same, a suspender rope, a counterweight for the same, a stop whereby the fall of said counterweight is arrested and a supplemental slack pulling counterweight.

4. In a transfer apparatus, in combination, an elevated hoisting rope sheave, a hoisting rope, a swinger frame engaging the fall of said hoisting rope, inhaul and outhaul swinger ropes connected with said swinger frame, an engine or motor shaft and drums for said inhaul and outhaul swinger ropes; one of said drums being revoluble and the other nonrevoluble on said shaft.

5. In a transfer apparatus, in combination, an elevated hoisting rope sheave, a hoisting rope, a swinger frame engaging the fall of said hoisting rope, inhaul and outhaul swinger ropes connected with said swinger frame, an engine shaft and drums for said inhaul and outhaul swinger ropes; one of said drums being revoluble and the other nonrevoluble on said shaft, and a brake applied to said revoluble drum.

6. In a transfer apparatus, in combination, an elevated hoisting rope sheave, a duplex hoisting rope consisting of a holding part and a closing part, a grab bucket connected therewith, a shaft, a drum revoluble on said shaft connected with said holding rope, a drum splined to said shaft connected to said closing rope, a brake for said revoluble drum, friction surfaces between the same and means whereby the pressure between said friction surfaces may be adjusted.

7. In a transfer apparatus, in combination, an elevated hoisting rope sheave, a duplex hoisting rope consisting of a holding part and a closing part, a grab bucket connected therewith, a shaft, a drum revoluble on said shaft connected with said holding rope, a drum splined to said shaft connected to said closing rope, a brake for said revoluble drum, friction surfaces between the same and means whereby the pressure between said friction surfaces may be adjusted, a swinger frame engaging the fall of said hoisting rope, outhaul and inhaul ropes and means for actuating the same.

8. In a load transfer, in combination, an elevated support, a hoisting rope passing over the same, a swinger connected to the hoisting rope, a suspender rope for the swinger, a counterweight for the swinger operating on the suspender rope, and means for taking up slack in said suspender rope.

9. In a load transfer, in combination, an elevated support, a hoisting rope passing over the same, a swinger connected to the hoisting rope, a suspender rope for the swinger, a counterweight for the suspender rope, a stop on the rope engaged by the counterweight, said stop comprising a supplemental weight adapted to take up slack in the suspender rope.

10. In a load transfer, in combination, an elevated support, a hoisting rope passing over the same, a swinger through which the hoisting rope passes, a suspender rope for the swinger, a guide, a counterweight guided thereby, said suspender rope slidably engaging said counterweight, a stop to limit movement of the counterweight, and a stop for limiting movement of the suspender rope relative to the said counterweight.

11. In a load transfer, in combination, an elevated support, a hoisting rope passing over the same, a swinger through which the hoisting rope passes, a suspender rope for the swinger, a guide, a counterweight guided thereby, said suspender rope slidably engaging said counterweight, a stop to limit movement of the counterweight, and a stop for limiting movement of the suspender rope relative to the said counterweight, said last-mentioned stop comprising a supplemental weight adapted to take up slack in the suspender rope.

12. In a load transfer apparatus a pair of masts, a boom on each of said masts, a hoisting rope extending over one of said booms, a swinger engaging said rope, a suspender rope for the swinger, and a swinger rope engaging the swinger and extending over the other boom.

13. In a load transfer apparatus, two masts, a boom on each of said masts, a hoisting rope extending over one of said booms, and a swinger rope engaging the hoisting rope and extending over the other of said booms.

In testimony whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

THOMAS SPENCER MILLER.

Witnesses:
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LOUIS G. RUGGLES.