T. S. MILLER.

LOAD TRANSFER APPARATUS.

APPLICATION FILED APR. 27, 1910. RENEWED SEPT. 3, 1912.

1,094,005.

Patented Apr. 21, 1914.

3 SHEETS—SHEET 1.

Fig. 1.

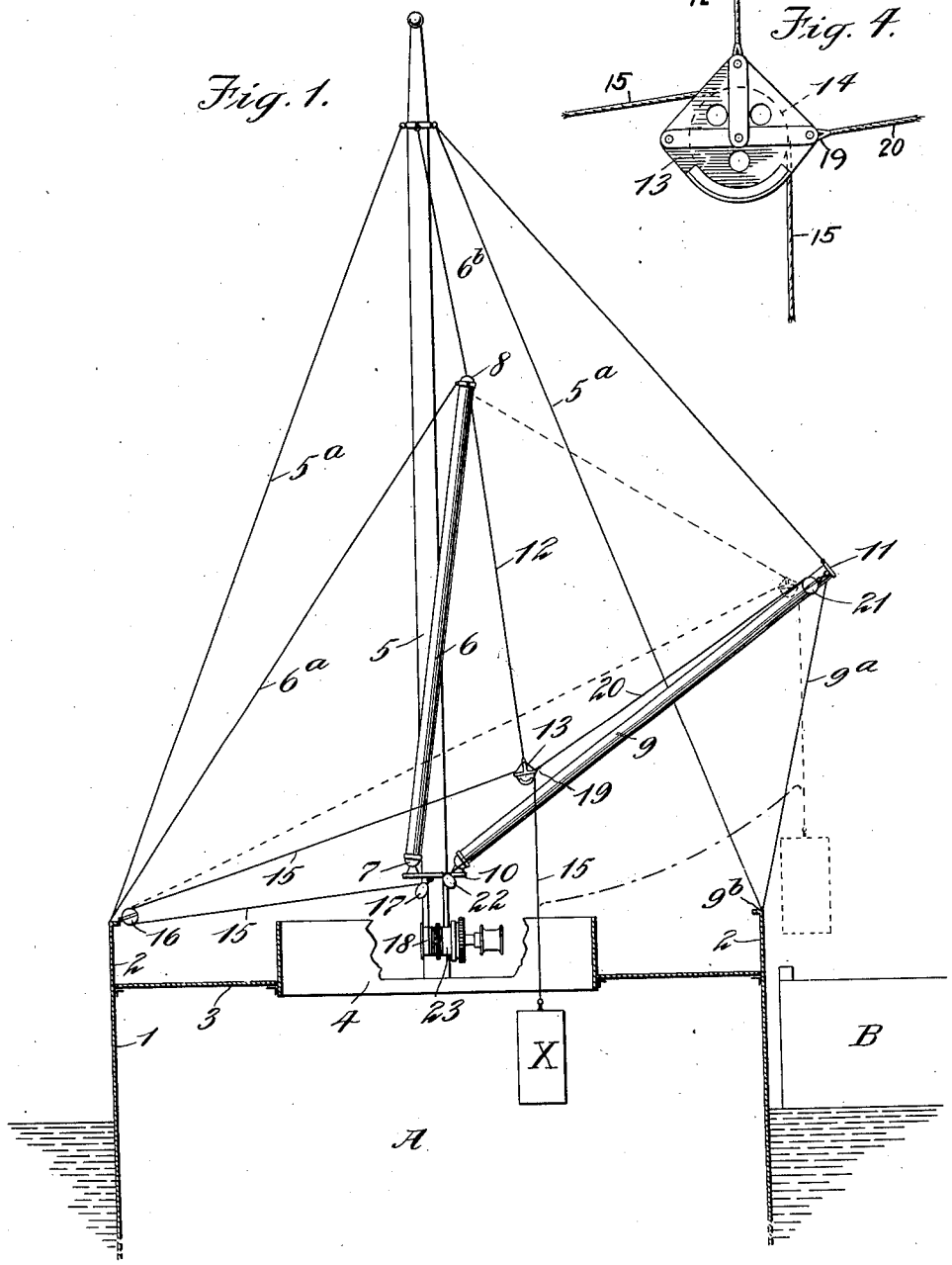

Fig. 4.

Witnesses:

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3 SHEETS—SHEET 2.

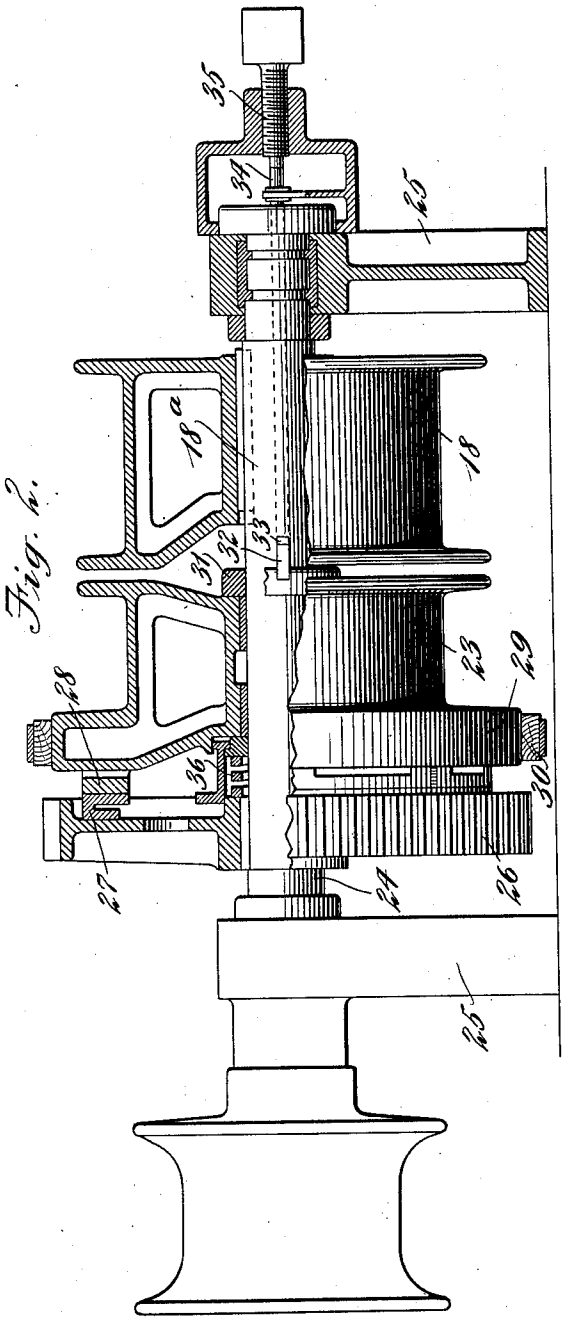

Fig. 2.

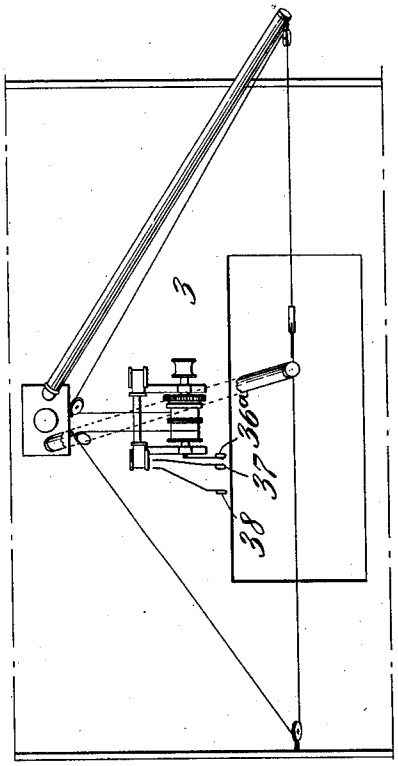

Fig. 3.

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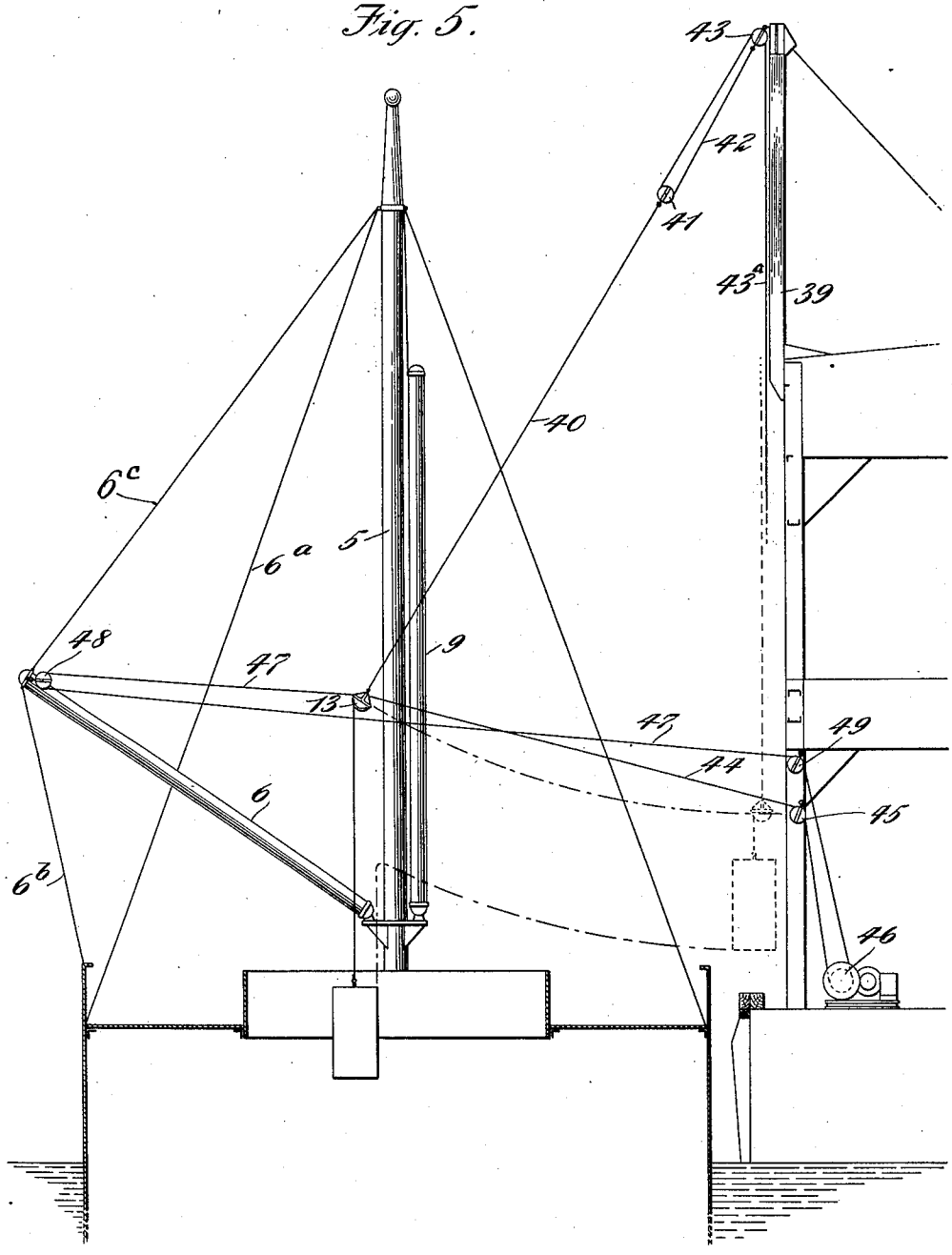
3 SHEETS—SHEET 3.

Fig. 5.



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UNITED STATES PATENT OFFICE.

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LOAD-TRANSFER APPARATUS.

1,094,005. Specification of Letters Patent. **Patented Apr. 21, 1914.**

Application filed April 27, 1910, Serial No. 557,982. Renewed September 3, 1912. Serial No. 718,395.

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, in the county of Essex and State of New Jersey, have invented a new and useful Improvement in Load-Transfer Apparatus, of which the following is a specification.

My invention relates to new and useful improvements in load transfer apparatus, and more particularly to that type in which is employed a hoisting rope for lifting the load, and separate means for moving or swinging the hoisting rope to transfer the load from a point of take-up to that of deposit.

One embodiment of the known type above mentioned includes a hoisting rope passing over an elevated support said rope being adapted to lift the load, and being engaged by swinger ropes to swing the load to the point of deposit and then return the hoisting rope to its original position to take up another load.

With the system just briefly outlined it is necessary to provide power operated means for operating the ropes having at least three drums, one for the hoisting rope, and two for operating the swinger ropes, or if the system operates on a clam-shell or other self-loading bucket, it is necessary to use four drums, one for the hoisting and closing rope, one for the holding rope and two for the swinger ropes.

The object of my present invention is to simplify the existing systems by dispensing with one of the swinger rope drums, and having but two drums, one for hoisting and swinging in one direction, and another for swinging the load in the other direction, so that I am able to use a single hoisting rope for performing both the lifting operation and to swing the load in one direction and a single swinger rope to swing the load in another direction.

In the embodiment of the invention hereinafter shown and described I have shown the same as adapted for lifting package material as contradistinguished from loose material, the material being loaded in packages and attached to the hoisting line at the point from which the load is to be transferred.

The invention consists in the improvements to be fully described hereinafter and the novelty of which will be particularly pointed out and distinctly claimed.

I have fully and clearly illustrated my invention in the accompanying drawings to be taken as a part of this specification, wherein—

Figure 1 is a cross section through the hull of a vessel, such, for instance, as a collier having a system embodying my invention applied thereto. Fig. 2 is a view in elevation partly in section of a rope drum engine for operating the ropes of the system. Fig. 3 is a top plan view of the system shown in Fig. 1; Fig. 4 is an enlarged detail view of a swinger frame used in connection with the system. Fig. 5 is a modified form of the invention showing the same used for the purpose of transferring loads from a vessel to a dock and in which the rope engine is mounted on the dock instead of on the vessel, as in Fig. 1.

Referring to Fig. 1 of the drawings, A designates a hull of a vessel such, for instance, as a collier, from which coal is to be taken and transferred to a dock or vessel, shown generally at B, the side wall of the vessel being shown at 1, the side rails at 2, 2, and the deck at 3, the latter being provided with a hatch 4 through which the load passes in being loaded on or taken from the collier. Mounted amidships and adjacent the hatchway is a vertical support illustrated in the form of a mast 5 of proper height and dimensions to stand the strains to which it is subjected during the operation of the system. Supported from this mast 5 is a boom 6 pivotally connected to the mast as at 7, and having its outer end positioned at a point approximately over the center of the hatchway through which the load is moved, said boom being guyed by a guy 6^a connecting the outer end 8 of the boom with the hull of the vessel, and by another guy 6^b connecting the free end of the boom with the upper end of the mast 5. The mast 5 may be braced by suitable guys 5^a connecting the upper end thereof with the hull of the vessel. 9 designates a second boom which is pivotally connected at 10 to the mast 5 at a point adjacent the base thereof, the free end 11 of said boom projecting outboard to overhang the point at which the load is to be taken in case the vessel is being loaded, or where the load is to be deposited in the event the vessel is to

be unloaded, the outer end of said boom being held by a guy 9^a connecting the same with the hull of the vessel as at 9^b. Supported from the free end 8 of the boom 6 is a swinging pendulum rope 12, the free end of which carries a swinger frame 13 in which is rotatably mounted a sheave wheel shown in dotted lines at 14 in Fig. 4. As the construction of this swinger frame is immaterial, as long as it will accomplish the object for which it is employed, I do not deem it necessary to enter into a more detailed description of the same. Passing through this swinger frame and over the sheave is a hoisting rope 15 which depends over the hatchway, as shown in Fig. 1. From the swinger frame 13 the hoisting rope passes to the side of the vessel opposite to that to which the load is to be taken, or deposited, the rope passing over a pulley 16 on the side of the vessel, and thence to a pulley 17 mounted on the mast from which it runs to a drum 18 on the hoisting engine. Connected to the swinger frame 13 as at 19, is one end of a swinger rope 20 which passes from the swinger frame to the outboard end of the boom 9, where it passes over a pulley 21 and thence back to and over a pulley 22 adjacent the pivoted end of the boom from which pulley it passes to and is wound upon a drum 23 forming part of the winding engine.

The winding engine to be used in connection with this system is shown in Fig. 2 in which the drums 18 and 23 above referred to are mounted upon a shaft 24 having bearings in suitable standards 25, the drum 18 being keyed to the shaft as at 18^a and the drum 23 being free to revolve relative to the shaft and also to have movement longitudinally thereof. Mounted on the shaft is a driving member which may be in the form of a spur gear 26, provided with a friction ring 27 adapted to contact with a friction ring 28 mounted on one end of the drum 23, so that when said friction surfaces are in proper engagement, the shaft, driving element and both drums rotate together, but when the drum 23 is separated from the gear 26, said drum may be free to revolve relative to the shaft, or to be held while the shaft revolves. The drum 23 may be provided with a brake flange 29 engaged by a band brake 30 for holding the drum against rotation or retarding the rotation thereof when desired. Associated with the drum 23 is a thrust mechanism consisting of a collar 31, cross piece 32 engaging the collar and extending through a slot 33 in the shaft, said cross piece and collar being acted upon by a rod 34 extending through the shaft and operated on by a thrust bolt 35 to move the drum 23 toward the driving element to place the friction rings 27 and 28 in driving contact. Suitable means, such as a spring 36, interposed between the driving gear and the drum 23, may be employed for breaking the frictional contact between the friction rings when the thrust on the drum is relieved. All of the details of the drum construction just described, while highly desirable in connection with the system constituting my invention, form no part of my present invention, and I therefore do not desire to be limited to any of the structural features thereof.

With the form of the rope operating engine shown and described but three operating levers are employed, and these are illustrated diagrammatically in Fig. 3, there being a lever 36^a for applying and relieving the friction, a foot lever 37 for operating the band brake 30, and a hand lever 38 for controlling and reversing the engine which drives the drums, all of the levers being so arranged as to be accessible to an operator from a fixed operating station. I have not illustrated the detailed construction of these levers and the manner in which they are connected to the parts they operate for the reason that they are all well known and form no part of my present invention.

I will now proceed to set forth the operation of the embodiment of the invention which I have just described. Presuming that the combined hoisting and swinging line 15 is in the hold of the vessel and attached to the load X to be hoisted and transferred, the operator first applies the brake to the swinger rope drum and then moves the reversing lever to admit steam to the engine to revolve the drum in the proper direction to hoist the load, this operation serving to hold the swinger frame 13 by means of the rope 20 while the load is being lifted, the pull on said rope opposing the pull on the rope 15. The load having been elevated sufficiently to swing clear of the superstructure of the vessel, the operator moves the lever 38 to cut off steam to the engine, releases the brake on the swinger-rope drum, and by means of lever 36^a moves the drum 23 into engagement with the driving gear 26, and then reverses the engines. This operation causes the combined hoisting and swinging rope to be paid out from the drum 18 and the rope 20 to be taken up by the drum 23 it being understood that one rope is wound on its drum in reverse direction to the other. By this operation the rope 20 pulls the swinger block 13 and with it the load out toward the end of the outboard boom, the load taking the course indicated by the dot-and-dash line, and this movement continues until the friction is relieved and the brake again applied to the drum 23, which serves to hold the swinger frame 13 over the position where the load is to be deposited. The continued operation of the engine paying-out rope 15 causes the load to descend upon

the wharf B, or other place of deposit, the drum 18 paying out the hoisting rope under steam. The steam is then cut off to the engine and the hoisting rope may be detached from the load. The reversing valve of the hoisting engine is then operated so as to drive the engines to cause the rope drum 18 to take up the hoisting rope 15, the drum 23 in the meantime being held by the brake. The hoisting rope 15 having been raised to the proper position, the brake on the drum 23 is released and the friction of said drum is applied so that said drum will be revolved to pay out the rope 20 and permit the combined hoisting and swinger rope 15 to pull the swinger frame 13 to a position over the hatchway. The swinger frame having reached the position just stated, the friction is released and the brake applied to the drum 23 to hold the swinger frame in position above the hatchway, after which the engine valve is reversed to permit the hoisting rope to be paid out and lowered into the hatchway, the swinger rope drum 23 being held by the brake during this operation.

In Fig. 5 I have shown another form of the invention in which the swinger rope is supported from an elevated support upon the wharf or dock, and in which the hoisting engine is also located upon the dock. In this form of the invention the steamer is provided with the mast and spars or booms as heretofore described, but the boom 9 is reefed up against the mast out of the way, as it is only necessary to use one boom in this form of the invention, and the boom 6 is shown lowered and supported by guys 6^b, 6^c connecting the end of said boom with the hull and the top of the mast, respectively. Mounted on the wharf is a superstructure from which rises a vertical support 39. 40 designates the pendulum rope for the swinger frame which is connected at one end to a block 41 of a running connection 42, the opposite block 43 of which is connected to the head of the vertical support 39, the rope of the running connection extending downward in the general direction shown at 43^a and is adapted to be secured in any suitable manner (not shown) so as to regulate and hold the rope 40 at any desired length. At the end of the swinger rope is a swinger frame 13 over which passes the combined hoisting and swinger rope 44 which passes over a block 45 on the dock and is wound upon a rope drum of the hoist 46. To one side of the swinger frame is connected a swinger rope 47 passing over a block 48 at the outboard end of the boom 6 whence it passes to and over a block 49 on the dock and is wound upon a second rope drum of hoist 46. These drums are of the same construction as shown in Fig. 2. Ropes 44 and 47 are wound on keyed and friction drums respectively in inverse direction. In this form of the invention the operation of the system is substantially the same as that form in which the swinger rope is supported from the boom 9 with slight variations. When it is desired to hoist a load the drum of the hoisting engine upon which the rope 47 is wound is connected to the friction and the engine is revolved in the proper direction to wind up the rope on the drum and pull the swinger frame out over the hatchway, the hoisting rope being paid out during this operation. The drum for the swinger rope is then detached from the driving gear and the brake applied thereto to prevent paying out of the swinger rope and thereby hold the frame 13 over the hatchway, and the continued operation of the hoisting rope drum pays out the combined hoisting and swinger rope 44 to lower into the hold or hatch of the vessel. While the rope is being attached to the load power is cut off. The load having been attached to the rope 44, the hoist is reversed to take up the combined hoisting and swinger rope, the swinger frame 13 being in the meantime held in position over the hatch by the brake being applied to the friction drum. When the load is elevated to the desired position, the brake or drum operating rope 47 is released and said drum is placed in driving engagement with the keyed drum, by application of the friction, so that the continued operation of the hoist swings the load toward the dock, the swinger rope being paid out to permit this operation. The load having reached a point over the dock where it is to be deposited, the brake is applied to the drum for the swinger rope and said drum is released from the driving gear after which the hoist is reversed to permit the combined hoisting and swinger rope 44 to be paid out to lower the load.

What I claim and desire to secure by Letters Patent of the United States is:—

1. In a load transfer apparatus, a support, a swinging rope supported therefrom and having a rope guide, a combined hoisting and swinger rope guided by said guide, and a rope opposing the pull on the hoisting rope.

2. In a load transfer apparatus, a support, a swinging rope supported therefrom and having a rope guide, a combined hoisting and swinger rope guided by said guide, and a swinger rope connected to the swinging rope and opposing the hoisting rope.

3. In a load transfer apparatus, a support, a swinging rope supported therefrom and having a rope guide, a combined hoisting and swinger rope guided by said guide adapted to hoist a load and swing it in one direction, and a swinger rope to swing the load in the opposite direction.

4. In a load transfer apparatus, a support, a swinging rope supported therefrom

and having a rope guide, a combined hoisting and swinger rope guided by said guide adapted to hoist a load and swing it in one direction, a swinger rope connected to the swinging rope to oppose the combined hoisting and swinger rope, and to swing the load in the opposite direction.

5. In a load transfer apparatus, an elevated support, a swinging rope supported therefrom and having a rope guide, a hoisting rope traveling at an angle to the swinging rope and guided by said guide, and a swinger rope connected to the swinging rope to swing the same in one direction.

6. In a load transfer apparatus, an elevated support, a swinging rope supported therefrom and having a rope guide, a combined hoisting and swinger rope traveling at an angle to the swinging rope and guided by said guide, and a rope opposing the combined swinger and hoisting rope.

7. In a load transfer apparatus, a suspended swinging rope guide, a combined hoisting and swinging rope engaging the guide and extending laterally from the guide, and a swinger rope opposing the lateral pull of the hoisting and swinger rope.

8. In a load transfer apparatus, a suspended rope guide, a combined hoisting and swinger rope passing over the guide and having a part extending at an angle to the vertical, and a swinger rope opposing said part and extending in a substantially opposite direction to said part.

9. In a load transfer apparatus, a suspension rope, a pulley block supported thereby, a hoisting rope passing through the block and at an angle to the suspension rope, and a rope connected to the suspension rope and opposing the hoisting rope.

10. In a load transfer apparatus, a suspension rope having a rope guide, a hoisting rope extending at an angle to the guide and depending therefrom over the same, and a swinger rope engaging the suspension rope and opposing the lateral pull of the hoisting rope on the suspension rope.

11. In a load transfer apparatus, an elevated support, a swinging rope suspended therefrom and carrying a rope guide, a laterally disposed rope guide, a hoisting and swinger rope guided by the laterally disposed guide and depending from the guide on the swinging rope, and a swinger rope acting on the first-named guide to oppose the swing thereof caused by the said hoisting and swinger rope.

12. In a load transfer apparatus, an elevated support, a swinging rope suspended therefrom and carrying a rope guide, a laterally disposed rope guide, a hoisting and swinger rope guided by the laterally disposed guide and depending from the guide on the swinging rope, and a swinger rope acting on the first-named guide to oppose the swing thereof caused by the said hoisting and swinger rope, and means to operate the swinger rope to swing the hoisting rope.

13. In a load transfer apparatus, an elevated support, a swinging rope suspended therefrom and carrying a rope guide, a rope guide disposed to one side of the support, a combined hoisting and swinger rope passing over said second guide and depending from the guide on the swinging rope, a rope guide disposed on the opposite side of the support, and a swinger rope passing over the last-mentioned guide and operable to oppose the combined hoisting and swinger rope and swing the same.

14. In a load transfer apparatus, a support, a swinging rope suspended therefrom and carrying a rope guide, a rope guide to one side of the support, a combined hoisting and swinger rope passing over said second guide, and depending from the guide on the swinger rope, a boom carrying a rope guide on the side of the support opposite to the said second guide, and a swinger rope guided by the guide on the boom and operable to swing the combined hoisting and swinger rope.

15. In a load transfer apparatus, a boom, a swinging rope suspended therefrom and carrying a rope guide, a second rope guide at one side of the point of suspension of the swinger rope, a combined hoisting and swinger rope guided by said guides, a second boom provided with a rope guide at the opposite side of said point of suspension, and a swinger rope guided by the last-mentioned guide and operable to swing the swinging rope.

16. In a load transfer apparatus, a swinging rope, a pulley block attached to the end thereof to swing therewith, a hoisting rope leading to and around said swinging pulley, a drum for the hoisting rope, a retaining and outward hauling rope operating on said swinging rope, and a winding drum for the retaining and outward hauling rope.

17. In a load transfer apparatus, a swinging pulley block, means for suspending the same, an out-haul rope attached thereto, and a combined hoisting and in-haul rope leading from said swinging pulley block in a direction opposite to that of the out-haul rope.

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

THOMAS SPENCER MILLER.

Witnesses:

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HARRY J. F. SMITH.