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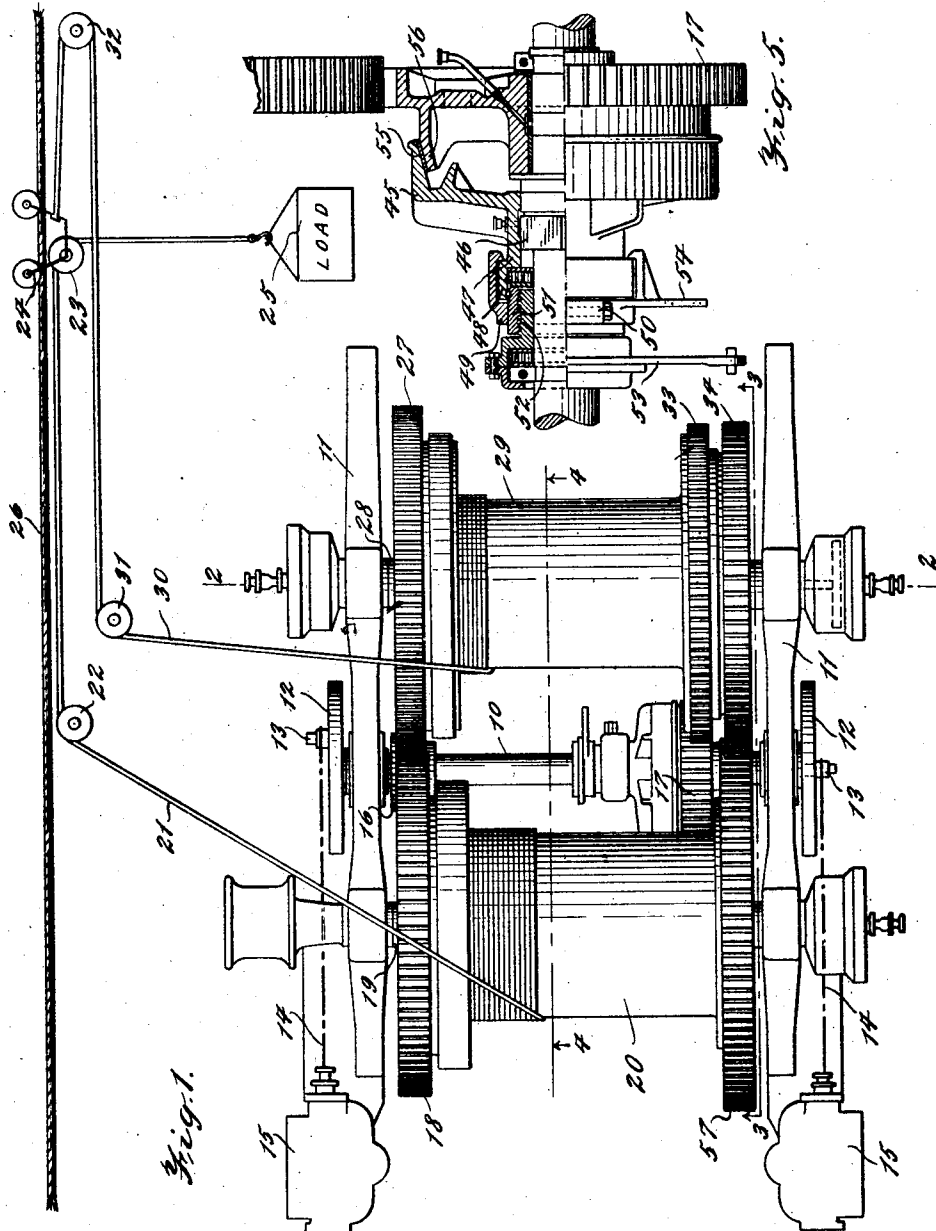
M. H. DICKINSON

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HOISTING AND CONVEYING DEVICE

Filed Oct. 9, 1924

2 Sheets-Sheet 1



INVENTOR.

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BY

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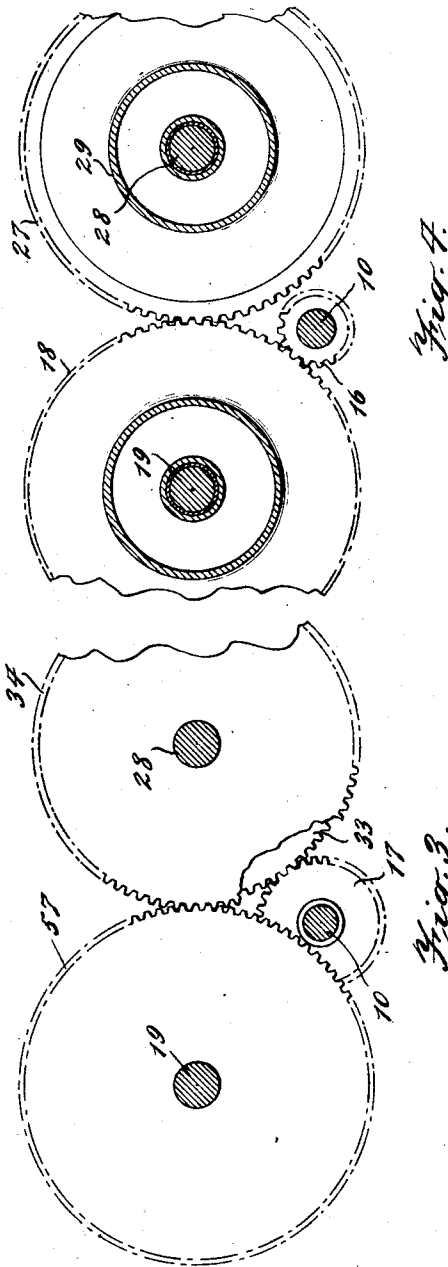
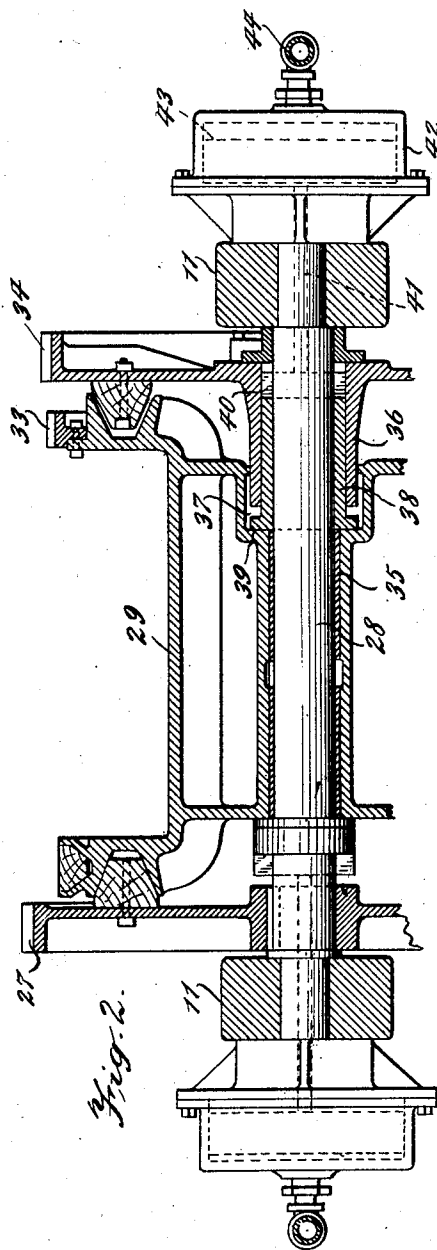
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HOISTING AND CONVEYING DEVICE

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

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HOISTING AND CONVEYING DEVICE.

Application filed October 9, 1924. Serial No. 742,530.

While not limited thereto, my invention is particularly applicable to the skidding of logs.

In skidding logs by what is known as the overhead interlocking cableway system, that is, a system in which the inhaul and the outhaul or receding drums are practically locked together and rotated in unison when skidding the logs, one of the difficulties present in the system has resulted from the varying effective diameters of the drum carrying the inhaul or skidding cable and that carrying the outhaul or receding cable. This difficulty is due to the piling up of the cable on the drum or the reverse as the cable is wound in or paid out, the reverse action taking place in the case of the other drum, and this difficulty becomes the greater as the length of span increases. My invention has for one of its objects the overcoming of the above-mentioned difficulty by apparatus that is both comparatively simple, efficient in operation, and satisfactory to operator.

My invention will best be understood by reference to the accompanying drawings, in which I have illustrated one embodiment of my invention and, in which Fig. 1 is a plan view of the winding engine embodying my invention, and illustrating in a diagrammatic manner the cables wound on the inhaul and outhaul drums, the cables and parts associated therewith, aside from the engine, being illustrated in side elevation; Fig. 2 is a section taken along the plane of the line 2—2 in Fig. 1; Fig. 3 is a section taken along the plane of the line 3—3 in Fig. 1; Fig. 4 is a section taken along the plane of the line 4—4 in Fig. 1, and Fig. 5 is a sectional view illustrating in detail a friction device.

Like reference characters indicate like parts throughout the drawings.

Referring to the drawings, 10 is a driving member in the form of a shaft having its bearings in the side members 11, 11 of the frame. Crank discs 12, 12 are secured on the ends of said shaft and are provided with the usual crank pins 13, 13 operated by connecting rods 14, 14, indicated in dotted lines, the opposite ends of which are operated by pistons in cylinders 15, 15 which receive steam from any suitable supply, not illustrated. On the shaft 10 is secured a pinion 16, preferably located near one end thereof, and near the opposite end a pinion 17 which

is loose on the shaft. The pinion 16 engages a gear 18 which is preferably, though not necessarily, keyed to a shaft 19 having its bearings in the side frames 11, 11 and carrying a skidding drum 20, which is also preferably, though not necessarily, loose on the shaft and movable longitudinally thereof. The skidding and hoisting cable 21 is wound upon the skidding and hoisting drum 20 and passes over a sheave 22 located adjacent the head tower in a well-known manner, and also passing over a sheave 23 on the carriage 24, the end of said cable being attachable to a load, diagrammatically indicated at 25, and which, of course, will be a log when the apparatus is used in log skidding. The carriage moves along a main supporting cable 26 in the usual way.

The gear 18 meshes with a gear 27 which is preferably keyed to the shaft 28, also having its bearings in the side frames 11, 11. The shaft 28 carries an outhaul drum 29 which is preferably loosely mounted thereon but longitudinally movable thereof. An outhaul cable 30 is wound upon the outhaul drum 29, the same passing over a sheave 31 located near the head tower, and over a sheave 32 located near the tail spar or tower, the opposite end of the outhaul cable 30 being attached to the carriage 24, as diagrammatically indicated in Fig. 1. The gear 17 meshes with a gear 33 secured to the drum 29.

The drum 29 is moved longitudinally of the shaft on which it is mounted to bring the same into frictional driving engagement either with the gear 27 or a gear 34, also mounted loosely on the shaft 28 adjacent to the gear 33 by known mechanism which will now be described. A sleeve 35 of bronze or other suitable bearing material is preferably interposed between the shaft 28 and the drum 29. As stated, the gear 34 is loose on the shaft 28 and, therefore, should have a comparatively long bearing. It also occupies a place on the shaft where it is necessary to have a cross key to thrust the drum in the opposite direction into engagement with gear 27. The gear 34 is therefore preferably provided with an elongated hub 36 extending into an enlarged opening 37 at the adjacent end of the drum 29, a thrust sleeve 38 being interposed between the hub 36 and the shaft 28. The left end of the sleeve 38, as viewed in Fig. 2, is brought into

engagement with the shoulder 39 at the end of the enlarged portion 37 by means of thrust mechanism, the construction and operation of which is well understood in the art, and which briefly stated comprises a cross key 40 extending through an elongated slot (not illustrated) in the shaft 28, the cross key, in turn, being engaged by a thrust pin 41 received in an opening extending axially of the shaft 28, the outer end of the thrust pin 41, in turn, being engaged by a thrust mechanism here illustrated as a piston 42 in a steam ram or cylinder 43, to the right-hand end of which steam is admitted through a suitable supply pipe 44. As the thrust mechanism at the opposite end of Fig. 2 is or may be the same as that described, the description of one will suffice for both, it being understood that the operation of the thrust mechanism moves the drum 29 into frictional engagement with the gear at the left of the drum.

The driving gear 17, which is loose on the shaft, is brought into operative engagement with the driving shaft 10 by mechanism best illustrated in Fig. 5, and which comprises a driving head 45, preferably mounted on a square portion 46 of the driving shaft 10 and movable longitudinally thereof. The hub 47 of the head 46 is provided with a flange 48 extending radially outward and which is engaged by an annular member 49 preferably split and bolted together, as at 50 to secure the same on a nut 51, the screw-threads of which engage the screw-threads on a sleeve 52 which is made stationary, as by a bracket 53 secured to the frame. The annular member 49 is provided with an operating lever 54 which may be actuated in any desired manner. The rotation of the operating lever 54 through the threaded engagement between the parts 51 and 52 causes the head 45 to move longitudinally of the shaft and bring a friction surface 55 thereon into or out of engagement with a cooperating friction surface 56 on the gear 17. A gear 57 in mesh with the gear 34 is secured to the drum 20.

In the operation of overhead interlocking cableway systems, the effective diameters of the outhaul and the inhaul or skidding drums vary, dependent upon the amount of cable on the drums, and for the reason above pointed out. When the load is being in-hauled, the relative effective diameters of the inhaul and outhaul drums vary, with the consequence that the load which is carried by the skidding cable first falls, and at the point when the diameters of the two drums are equal, the load momentarily remains stationary as regards its height and then, as the effective diameter of the inhaul drum becomes greater than that of the outhaul drum, the load rises as it moves from the tail mast or tower to the head mast or tower with

the attendant danger that the load may collide with the carriage and cause the skidding line to part. This tendency of the load to rise or fall has been overcome in systems of the general type illustrated in my application either by slipping the frictions or by stopping at intervals, and either raising the load by operating the skidding cable while holding the outhaul cable stationary or by lowering the load by holding the skidding cable stationary and paying out the outhaul cable. Slipping of the frictions produces great wear and tear on the parts and greatly shortens the life of the frictions; furthermore, when the skidding drum friction is allowed to slip, the speed of travel of the load along the main cableway is greatly decreased, thus consuming considerable extra time in bringing in the load. On the other hand, when the drum is stopped and the load raised or lowered, as the case may be, a considerable amount of extra time is consumed in bringing in the load.

My invention overcomes the difficulties above referred to. When the carriage is at the head tower, and it is desired to move it to a position near the tail mast, where it can take a load, the gear 17 is brought into operative relation with the driving shaft 10 by movement of the friction member 55 to the right, as viewed in Fig. 5, and in the manner described, and the drum 29 is released from frictional engagement with the gear 34. At the same time, the friction clutch is removed from the drum 20, so that the latter is free to rotate. The outhaul or receding drum 29 is thereby rotated in a direction to haul the carriage from the head mast or tower to the tail mast, the movement of the carriage causing the skidding or inhaul cable 21 to rotate the drum on which it is wound, and thus pay out the cable. At this time the drums 20 and 29 are not interlocked, the positive rotation of the outhaul or receding drum 29 rotating the skidding drum by the tension on the cable, and the speed of the carriage, which at this time is unloaded, is relatively high depending upon the ratio of teeth on the gears 17 and 33, the gear 17 preferably being larger than the gear 16. When the end of the inhaul or skidding cable has been attached to the load, the load is lifted to the desired height by holding the outhaul drum stationary. Then the drums 20 and 29 are thrown into frictional engagement with the gears 18 and 27, respectively, and the drums thereby rotated in opposite directions and at a relatively low speed, and in directions to inhaul the load, the two drums at this time being interlocked. At the beginning of the inhaul movement of the load, the effective diameter of the inhaul or skidding drum is relatively small and the diameter of the outhaul or receding drum is relatively large. As the load moves from the tail mast or

tower toward the head mast or tower, the relative effective diameters of the two drums change and, in order to bring about a corresponding change in the relative speeds of the two drums, the operator shifts the drum 29 from engagement with the gear 27 into engagement with the gear 34. The drum 29 is then rotated in the same direction as previously and in the opposite direction to the drum 20 by the pinion 16, gear 18, gear 57, which is fast to the drum, gears 34 and 33, the speed ratio of the drum 29 at this time to the drum 20 being higher than previously to compensate for the relative change in their effective diameters, the diameter of the gear 57 being greater than that of the gear 18.

It will be observed that during the entire inhaul operation, the speed of the inhaul drum is not changed, the relative change in speed between the inhaul and the outhaul drums being effected by speeding up the outhaul drum. This means that the movement of the carriage from its position near the tail mast or tower to a position near the head mast or tower is not slowed down, and this advantage is preserved while providing the advantages of the change in relative speeds between the inhaul and outhaul drums.

It will of course be understood that various modifications in the devices illustrated may be made without departing from the spirit of my invention and without exceeding the scope of the claims.

I claim:

1. In combination, a main cable, a carriage mounted thereon and adapted to be moved therealong, a driving member, an inhaul and an outhaul drum on each of which a cable is wound, the cables being connected to and adapted to move said carriage in opposite directions, a driving member, means for driving said inhaul and outhaul drums in interlocked relation in the inhaul direction, and means for changing the speed ratio of said drums while rotating in the inhaul direction by changing the speed of rotation of the outhaul drum.

2. In combination, a main cable, a carriage mounted thereon and adapted to be moved therealong, a driving member, an inhaul and an outhaul drum on each of which a cable is wound, the cables being connected to and adapted to move said carriage in opposite directions, a driving member, means for driving said inhaul and outhaul drums in interlocked relation in the inhaul direction, and means for changing the speed ratio of said drums while rotating in the inhaul direction by changing the speed of rotation of the outhaul drum while maintaining a substantially uniform speed of the inhaul drum.

3. In a winding engine, a rotatable driving member, an inhaul and an outhaul

drum driven thereby in interlocked relation in the inhaul direction, means for changing the speed ratio of the said drums when rotating in the inhaul direction by changing the speed of the outhaul drum, and means for actuating said drums at a different speed in the outhaul direction operable from said driving member when rotating in the same direction as when it drives said inhaul and outhaul drums in interlocked relation.

4. In a winding engine, a rotatable driving member, an inhaul and an outhaul drum driven thereby in interlocked relation in the inhaul direction, means for changing the speed ratio of the said drums when rotating in the inhaul direction by changing the actual speed of the outhaul drum, and means for actuating said drums at a different speed and in non-interlocked relation in the outhaul direction operable from said driving member when rotating in the same direction as when it drives said inhaul and outhaul drums in interlocked relation.

5. In a winding engine, inhaul and outhaul drums, shafts on which the respective drums are mounted, meshing driving gears mounted on the respective shafts adjacent to the respective drums and adapted frictionally to engage the same, a driving shaft and pinion fast thereon meshing with one of said gears for driving said gears in opposite directions to each other to inhaul the load, other meshing gears at the opposite ends of the drums, the gear at the end of the inhaul drum being fast to the drum and of a larger diameter than the gear adjacent to the opposite end thereof, and means for moving said drums longitudinally of their shafts to bring the inhaul drum into operative engagement with its driving gear, and the outhaul drum into operative engagement with the gear at either end thereof whereby said drums may be driven in opposite directions to each other and at different relative speeds in the inhaul direction.

6. In a winding engine, inhaul and outhaul drums, shafts on which the respective drums are mounted, meshing driving gears mounted on the respective shafts adjacent to the respective drums and adapted frictionally to engage the same, a driving shaft and pinion fast thereon meshing with one of said gears for driving said gears in opposite directions to each other to inhaul the load, other meshing gears at the opposite ends of the drums, the gear at the end of the inhaul drum being fast to the drum and of larger diameter than the gear adjacent to the opposite end thereof, and means for moving said drums longitudinally of their shafts to bring the inhaul drum into frictional driving engagement with its driving gear, and the outhaul drum into frictional driving engagement with the gear at either end thereof whereby said drums may be

driven in opposite directions to each other and at different relative speeds in the inhaul direction.

7. In a winding engine, inhaul and out-haul drums, shafts on which the respective drums are mounted, meshing driving gears mounted on the respective shafts adjacent the respective drums and adapted frictionally to engage the same, a driving shaft and pinion fast thereon meshing with one of said gears for driving said gears in opposite directions to inhaul the load, other meshing gears at the opposite ends of the drums, the gear at the end of the inhaul drum being fast to the drum and of larger diameter than the gear adjacent the opposite end thereof and the gear at the end of the out-haul drum being adapted to be clutched thereto, a gear fast to the outhaul drum, a pinion loose on the driving shaft meshing with the said gear fast to the outhaul drum, and means for operatively connecting said last-named pinion to its driving shaft.

8. In a winding engine, inhaul and out-haul drums, shafts on which the respective drums are mounted, meshing driving gears mounted on the respective shafts adjacent the respective drums and adapted frictionally to engage the same, a driving shaft and pinion fast thereon meshing with one of said gears for driving said gears in opposite direction to inhaul the load, other meshing gears at the opposite ends of the drums, the gear at the end of the inhaul drum being fast to the drum and of larger diameter than the gear adjacent the opposite end thereof and the gear at the end of the outhaul drum being adapted to be clutched thereto, a gear fast to the outhaul drum, a pinion loose on the driving shaft and of larger diameter than the first-mentioned pinion, meshing with the said gear fast to the outhaul drum, and means for operatively connecting said last-named pinion to its driving shaft.

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