G. FRINK.

DUPLEX TWO-SPEED AERIAL YARDER.

APPLICATION FILED JUNE 2, 1921.

1,404,358.

Patented Jan. 24, 1922.

2 SHEETS—SHEET 1.

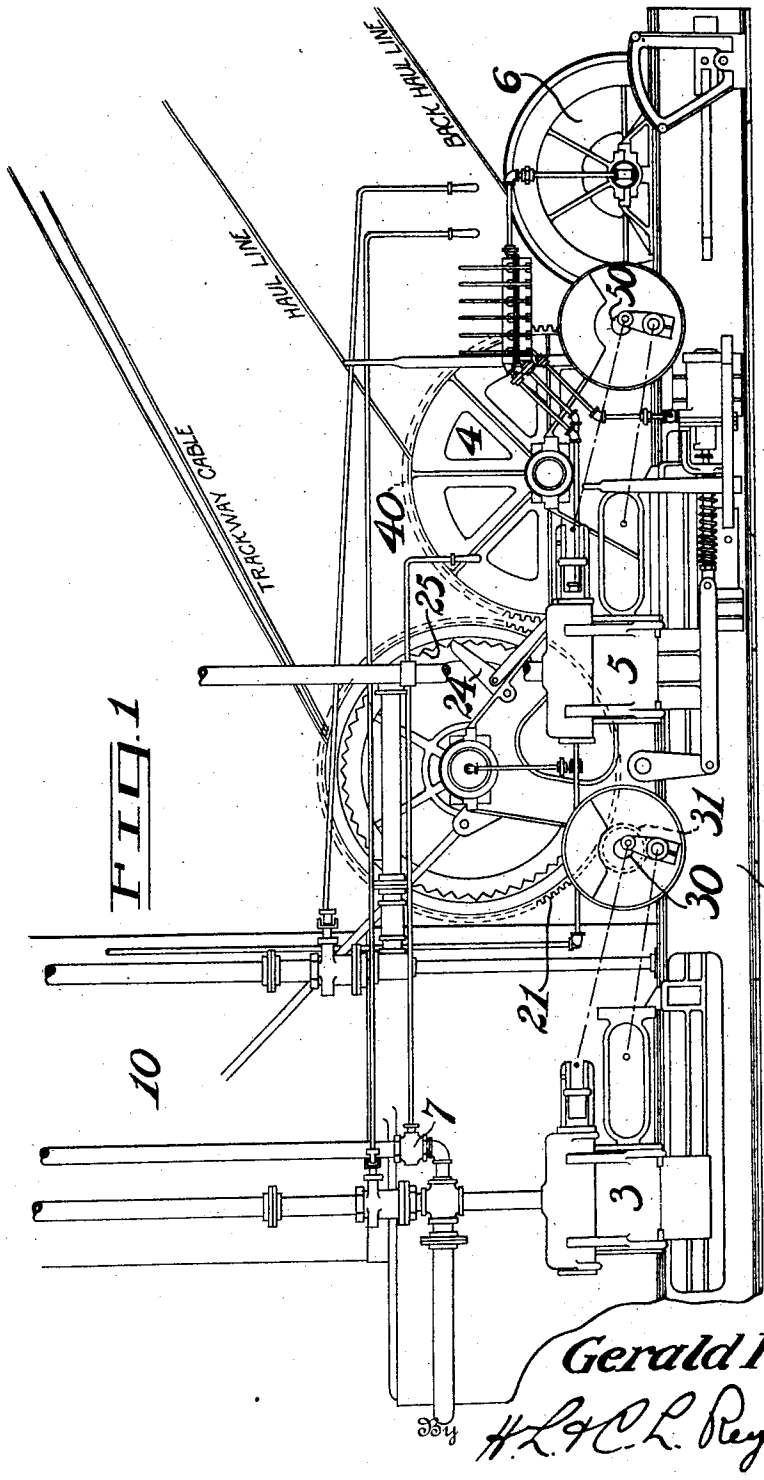


FIG. 1

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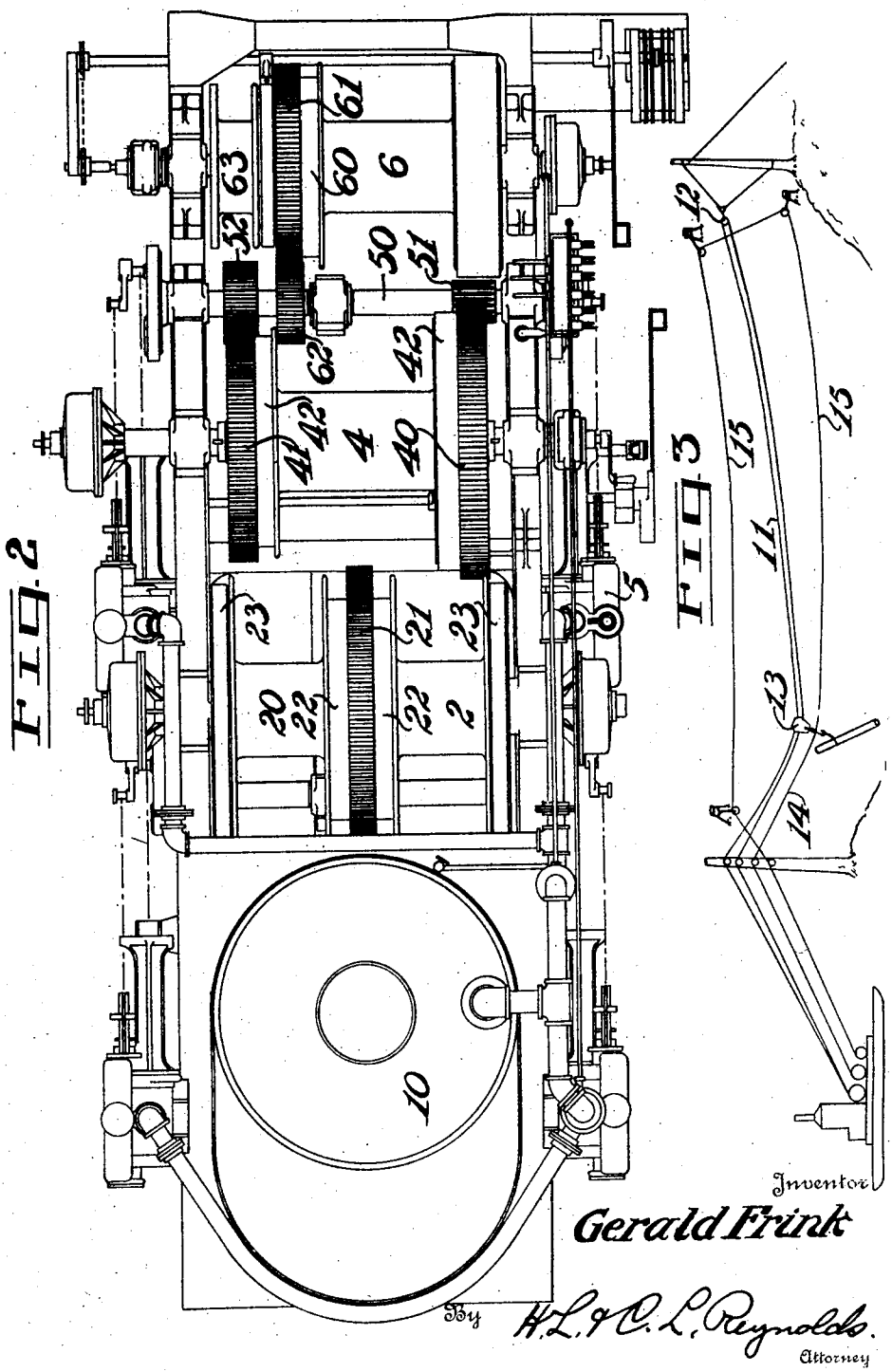


FIG. 2

FIG. 3

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UNITED STATES PATENT OFFICE.

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DUPLEX TWO-SPEED AERIAL YARDER.

1,404,358. Specification of Letters Patent. Patented Jan. 24, 1922.

Application filed June 2, 1921. Serial No. 474,491.

To all whom it may concern:

Be it known that I, GERALD FRINK, a citizen of the United States of America, and resident of the city of Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Duplex Two-Speed Aerial Yarders, of which the following is a specification.

My invention relates to wire cable or rope handling engines and particularly to engines of this type which are especially designed for operating cableway logging systems.

The object of my invention is to provide an engine which is particularly designed for convenient and rapid operation of a special type of cableway which has been found excellently adapted to logging in mountainous and rough country.

In the accompanying drawings I have shown an engine which has my invention incorporated therein and will hereinafter describe its construction and the manner of operating it. The particular features of this engine which I deem to be new and upon which I desire a patent will be defined in the claims terminating this specification.

The accompanying drawings show my invention in my present preferred form of construction.

Figure 1 is a side view of the engine.

Figure 2 is a plan view of the engine.

Figure 3 shows the type of cableway which the engine is designed to operate.

The entire apparatus of this engine, including the boiler for supplying steam, is mounted upon a base frame which contains a series of longitudinal beams 1 and a connecting floor. When in use in the woods, this base frame has fixed thereto two big logs which project at each end and which constitute a sled or runners whereby the engine may be moved from place to place as well as adding additional stiffness to the base frame and a larger supporting base. The boiler 10 is mounted upon one end of the base frame 1.

The type of cableway for the operation of which this engine has been designed, is shown in the diagram which forms Figure 3. This has a double or looped main or track line 11 which passes over a tail block 12 and has its ends winding each upon its respective drum of the engine. It also employs a carriage 13, a haul line 14 and a back haul line 15 and suitable guide pulleys or sheaves for said lines. The back haul line preferably has its outward run located at one side of the line of the cableway, so that it will not interfere with operations or become entangled with the other lines.

Referring to Figure 2 of the drawings, the drums 2 and 20 receive the ends of the main or trackway cable. These drums are located in a slightly raised position just forward of the boiler and are loose upon a common shaft. They are driven from a pair of engines 3 located close at the sides of the boiler and having its crank shaft 30 provided with a pinion 31 which meshes with a gear 21 secured to the shaft. Friction driving means located at 22, 22, of any suitable construction and operating means therefor are provided whereby the drums may be driven from their engine. Brakes 23, 23 are also provided. In addition to these, each drum 2 and 20 is provided with a ratchet band 25 and a holding dog 24 by which the drums may be held against backward turning.

The haul line drum 4, is located forwardly of the drums 2 and 20 and preferably at a somewhat lower level. This drum is secured upon its shaft and preferably is provided with two driving means which give it different speed and power. The drum shaft has two gears 40 and 41 of different diameters loose thereon and the shaft 50 of the engine 5 by which it is driven has two pinions, 51 and 52 meshing with these gears. Two friction driving devices located at 42, 42, of any suitable construction serve to connect this haul line drum with either gear 40 and 41. A brake band is also associated with one of the flanges at 42.

Forward of the haul line drum and preferably at a slightly lower level, is the back haul drum 6. This is also loose upon its shaft and is driven through a friction device at 60 which connects it with the gear 61 which is secured to the drum shaft. A pinion 62 on engine shaft 50 drives gear 61.

Upon the same shaft as drum 6, is loosely mounted a small drum 63 which is also provided with a friction driving means of any suitable type. This drum is used for general utility and miscellaneous uses. Means are provided, of any suitable type of construction, whereby to control the operation of the engines and the application of the friction drives, brakes and holding dogs. As these means may be of any suitable con-

struction and such means are well known in the art, particular description thereof is not thought necessary.

The engines 3 which operate the main or trackway line, have a snubbing valve 7 connected with but not in the steam supply line between the throttle and the engine cylinders. This valve is capable of making connection with the outside air. This is operated to use the engines as a brake in lowering the cableway and the loads carried thereby.

In case the drums 2 and 20 are allowed to turn backward while secured to their shaft, the engines 3 will be operated in a reverse direction. Assuming that the steam is shut off, air will be drawn into the cylinders, compressed, and delivered into the steam supply line. If no escape is provided for this the pressure thereof upon the pistons will quickly stop the engine. By opening the snubbing valve slightly, the escape of this air will be permitted, the rate of escape being controllable so that the engine thus acts as an effective brake on the drums.

The separation of the motive power for operating the drums 2 and 20 from that by which the haul and back-haul drums are operated, adds much to the convenience of operation and also to the effectiveness of the apparatus. This, together with the separate friction drives for the drums makes it possible to apply the power of the engines 3 to operate both drums 2 and 20 at the same time or either alone. In the one case speed of action is secured and in the other power. The operator thus has at his command two hoisting speeds and powers.

By using the two driving means having different speed ratios on the haul drum 4, a like advantage is secured. The greater speed ratio is used where the work is moderate and the lesser when the work is heavy. The haul and back-haul drums being operated from another engine than that which operates the main line drums, permits a greater range of action and particularly in the possibility of using the snubbing valve in the manner just described.

An inspection of the diagram shown in Figure 3 discloses the reason for locating the drums in the relative positions shown. In the type of cableway illustrated the double or looped trackway line, to secure non-interference in the leads of the lines, must be above and the haul line below, while the haul-back line, which is led off to one side away from the cableway, must be below. While usually the engine is located so that the leads extending therefrom extend upwardly at a material angle, there are times when this angle is reduced to very little.

In consequence of the above facts, locating the main or trackway cable drums at the rear and in raised position and putting the haul and back haul line drums in successive forward and lowered positions, brings the leads so as to fit the conditions existing in the cableway and enables handling of the lines without crossing or interference. If the drums were not located as shown, there would have to be crossing of lines and this would produce wear.

By having a looped trackway line and separate drum for each end, both drums may be operated at once to get speed, if the pull is not too heavy, or by operating only one, double power at half speed may be obtained. This involves means for locking or holding one drum. Furthermore, to avoid tangling or twisting of the two leads of the main or trackway line, it is desirable to apply the pull to the uppermost lead somewhat before applying it to the lower. There is just enough friction in the tail block and associated with the lower lead, together with the inertia of said lower lead, to raise first the upper lead and get it clear of the lower lead, as well as to straighten up the carriage if it has become turned. In consequence, twisting of these lines about each other is avoided, or, if it has occurred, they are straightened out. If operated to haul one in while they are twisted, rapid cutting action occurs.

Aerial logging cableways, such as this engine is designed to handle, are often subjected to very heavy and sudden surges, as when a big log which is being dragged over a downward incline comes to a sharp pitch and starts to slide down it or swings clear of the ground. With the main or trackway line tensioned at one end by the steam pressure in the engine, the engine will be turned backward against the steam pressure. There is therefore an important element of safety in preventing excessive strains upon the cables.

What I claim as my invention is:

1. In combination a cableway logging engine comprising a frame having thereon at one end a boiler, a pair of engines located at opposite sides of the boiler and connected with a common crank shaft, a pair of cableway operating drums mounted upon a common shaft which extends transversely of the frame, close to and forwardly of the boiler and lies in raised position, means for driving said shaft from the crank shaft of said engines, means for operating said drums in unison or independently from the shaft by which they are carried, an endless cableway having its opposite ends connected to the drums of said pair respectively, a second pair of engines mounted forwardly of the first pair and having a common crank shaft, a haul line drum mounted forwardly of and lower than the cableway operating drums, a back haul line drum mounted forwardly of and lower than the haul line drum, means

for independent operation of the haul line and back haul line drums from the second pair of engines, a carriage mounted to travel on the cableway and a haul line and back haul line connected to said carriage and to the haul line and back haul line drums.

2. A cableway logging engine comprising a base frame, a pair of engines, a common crank shaft to the opposite ends of which the engines are connected, a drum shaft located above and driven from the said engine shaft, a pair of main line drums loosely mounted upon said drum shaft, means for independently and jointly operating said drums from said engines, a second pair of engines located forwardly of and alined with the first pair, a shaft and haul line drum thereon located forwardly of and lower than the main line drums, two separate means for operating said haul line drum from the second pair of engines in like direction and at differing speeds, a back haul drum, located forwardly of and below the haul line drum and means for operating said back haul drum from the second pair of engines.

3. A logging engine comprising a frame having two independent engines thereon, a pair of drums loose upon a common shaft and operated by one engine, a trackway cable having a looped outer end and with its ends connected each with its respective one of said drums, a tail block carrying the loop of said cable, a carriage traveling upon the trackway cable, a second pair of engines, a haul drum and a haul-back drum mounted upon separate parallel shafts and operated by said second engine, a haul line and a haul-back line connected with the carriage and each with its respective drum of the latter pair.

Signed at Seattle, King County, Washington, this 27th day of May, 1921.

GERALD FRINK.