ABSTRACT OF THE DISCLOSURE

The combination of a constant tension winch with a constantly slipping clutch provides a mechanism when the load attached to the winch has a constant tension thereon, so that this load will not move relative to the winch. The amount of slippage of the clutch can be varied to alter the tension on the winch as might be required. Even though the load is stationary at times, the clutch is still slipping during the periods of movement or non-movement of the load.

This invention relates to a slip clutch constant tension winch where the clutch portion of the device slips constantly, but the rate of slippage is variable by the operator to alter the amount of tension on the cable which reels onto or off of the winch drum.

An object of my invention is to provide a novel slip clutch constant tension winch in which the clutch is of a type which can be effectively cooled to absorb the heat generated in the clutch due to its slippage.

Another object of my invention is to provide a novel constant tension winch device in which the clutch associated therewith is of the constant slip type, and where the cooling medium is a suitable gas or liquid, and also where the tension of the clutch is controlled by a suitable liquid cooling means.

Still another object of my invention is to provide a novel constant tension winch of the character stated in which the winch and the clutch are arranged in a unit and is, therefore, relatively compact and more effective in operation.

Other objects, advantages and features of my invention may appear from the accompanying drawings, the subjoined detailed description and the appended claims.

In the drawing:

The figure in the drawing is a longitudinal vertical sectional view of my slip clutch constant tension winch. Referring more particularly to the drawing, the numeral 1 indicates a horizontal shaft with journaled bearings 2 and 3. A winch drum 4 is nonrotatably mounted on the shaft 1 between the bearings 2 and 3, and the usual cable 5 is spooled onto the drum 4 and moves either off of or onto that drum, depending upon the requirements of the winch. In this invention it is desirable that a constant tension be maintained on the cable 5 as it moves onto or off of the drum 4 and, furthermore, that the amount of tension on the cable 5 be altered or adjusted by the operator to suit the particular requirements to which the winch is placed. A master gear 6 is journaled on the shaft 1 on the bearing 7. The master gear 6 is rotated by a pinion 8 and from a suitable source of power applied to the shaft 9, which power is not shown. The master gear 6 is rotated at a constant speed, and power from the gear 6 is transmitted to the shaft 1 through a clutch 10. The clutch 10 may be any one of a type known as constant slip, and one of the types which is suitable is illustrated in Patent No. 2,944,790, July 12, 1960, and particularly FIG. 4 of this patent. Since the clutch mechanism slips constantly, in order to maintain the required tension on the cable 5 while that cable is moving relative to the drum 4, it is necessary that the clutch shall be adequately cooled so that the heat caused by slippage is dissipated and, therefore, the engaging parts of the clutch will not be injured.

A sleeve 11 is journaled on the shaft 1 and normally remains stationary as far as the shaft is concerned. A distributor ring 12 is journaled on the sleeve 11 and, therefore, rotates on the sleeve and turns with the outer shell 13 of the clutch 10. The shell 13 is bolted or otherwise fixedly attached to one face of the gear 6 by means of a plurality of bolts or studs 14. Thus the outer shell or housing of the clutch 10 will be rotated constantly as the gear 6 rotates and will turn at the same speed as the gear.

The inner ring 15 of the clutch 10 is suitably attached to the shaft 1 to rotate the shaft through the usual media of frictional clutch plates 16, which are pressed into engagement with the driving ring 17 by suitable control means such as the expandable tube 18. This expandable tube is activated by appropriate fluid pressure, such as air under pressure, and this air is admitted from a compression or the like in the pipe 19 and then passes through a fitting 20, thence into the sleeve 11 and, finally, into the ring 12. A plurality of pipes 21 extend from the ring 12 and thence to couplings 22 which admit the air under pressure into the tube 18. As the tube 18 expands it forces the friction plate 16 against the drive ring 17, and thus will rotate the shaft 1 at the desired speed and exerting the necessary tension or pull on the cable 5.

Since there is constant slippage in the clutch 10 between the driving plates 16 and the corresponding engaged parts, it will be necessary to effectively cool the driving parts of the clutch 10, and this is accomplished by a suitable cooling medium such as water, which is conducted through the pipe 23 and then into the sleeve 11 and out of this sleeve through a pipe 24 to the intake fittings 25 and 26. The cooling fluid is then circulated in the cooling passages 27 in the clutch 10 to effectively cool the clutch and carry away the heat engendered by friction. Constant tension is thus maintained on the cable 5 and this tension can be varied by the operator by controlling the pressure of the air in the tube 18, or by some similar control means. The clutch 10 will slip constantly, but at the same time the drum 4 will be rotated to reel in the cable 5 due to the constant rotation of the drive gear 6 and the consequent driving of the clutch 10.

Having described my invention, I claim:

1. A slip clutch constant tension winch comprising a shaft, a drum mounted on said shaft and a cable reeled on the drum, a drive gear journaled on said shaft, drive means, a pinion meshing with the drive gear, said pinion being driven by the drive means, a constant slip clutch interposed between said drive gear and said shaft, the rate of slippage of said clutch being varied by an operator, and cooling means in said clutch to constantly cool the engaging parts of the clutch to permit the clutch to slip constantly over long periods of time without overheating and without moving a load attached to said cable vertically to any appreciable extent.

2. A slip clutch constant tension winch as recited in claim 1 and said cooling means including a fluid conduit, said clutch having cooling passages therein and said conduit extending to said passages.

3. A slip clutch constant tension winch as defined in claim 1, and said drive gear being journaled on the shaft, said cooling means including a fluid conduit, said clutch having cooling passages wherein and said conduit extending to said passages.
4. A slip clutch constant tension winch as recited in claim 1, and said constant slip clutch including a shell, means securing said shell to the drive gear, friction disks in said clutch, and an expandable tube operatively connected to the friction disks to engage the friction disks on expansion of the tube.

5. A slip clutch constant tension winch as recited in claim 1, and said constant slip clutch including a shell, means securing said shell to the drive gear, friction disks in said clutch, and an expandable tube operatively connected to the friction disks to engage the friction disks on expansion of the tube, said cooling means including a fluid conduit, said clutch having cooling passages therein and said conduit extending to said passages.