Nov. 24, 1942. L. BERNER 2,303,020

FAIRLEAD CONSTRUCTION

Filed Aug. 12, 1940 3 Sheets-Sheet 1

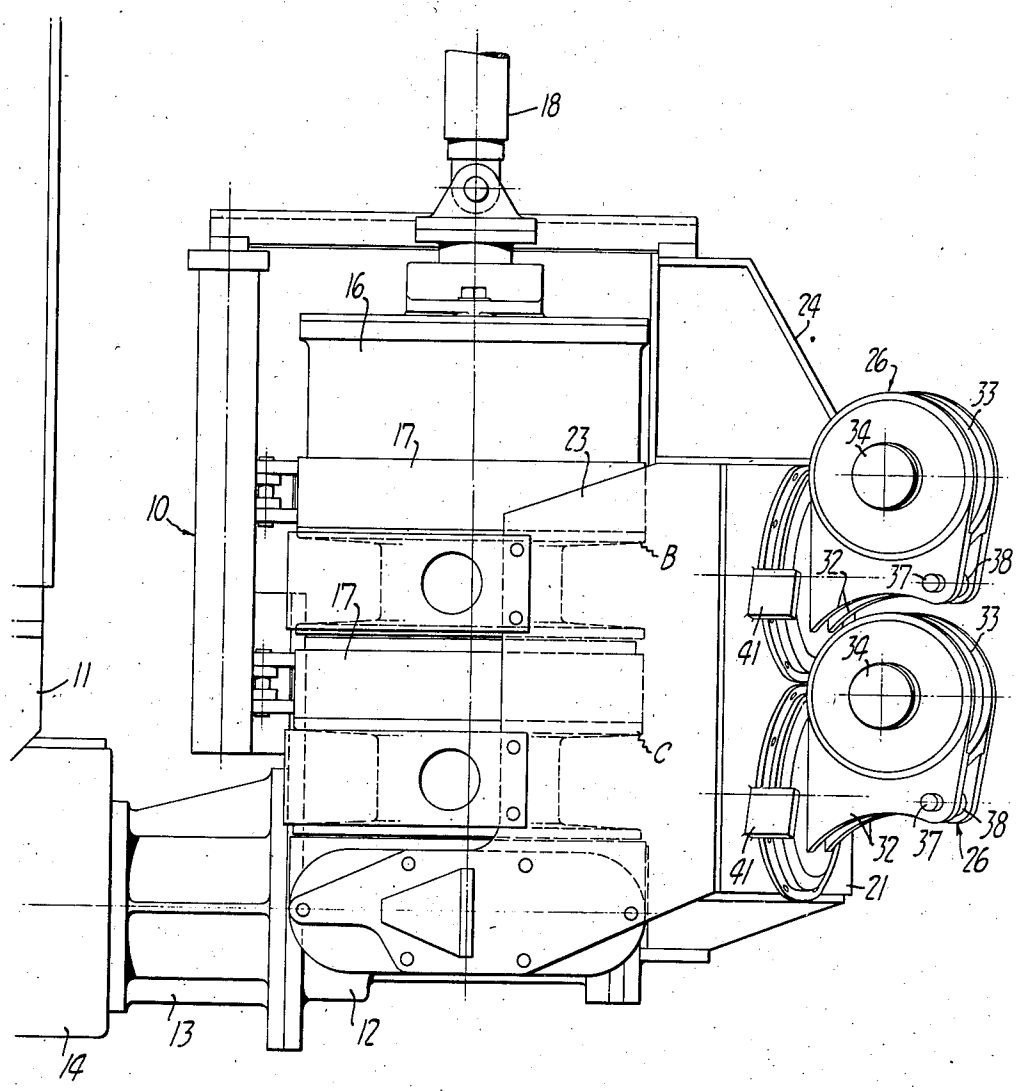


FIG_1_

INVENTOR
Leo Berner
BY Paul O. Fleck
ATTORNEY

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FAIRLEAD CONSTRUCTION

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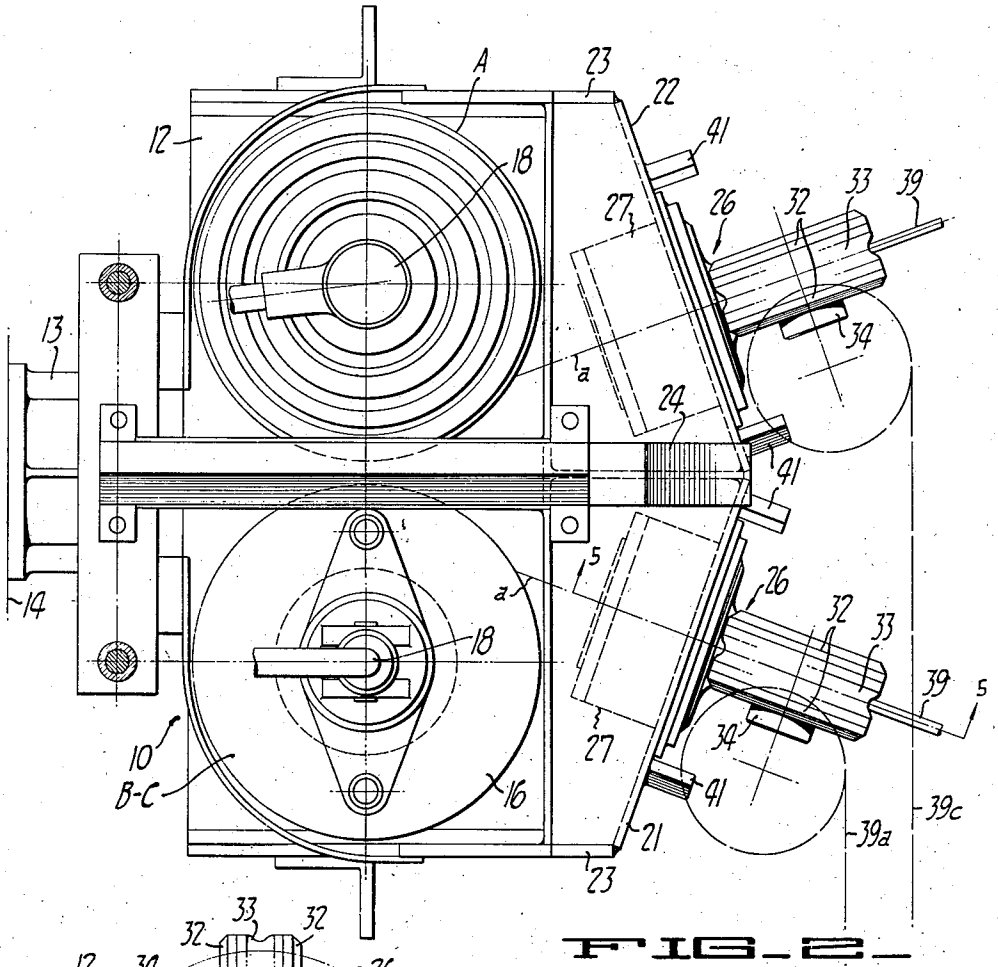


FIG_2_

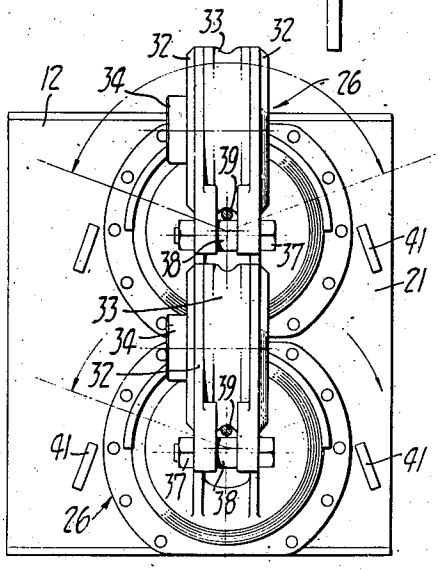


FIG_3_

INVENTOR
Leo Berner
BY Paul O. Fleher
ATTORNEY

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FAIRLEAD CONSTRUCTION

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FIG_4_

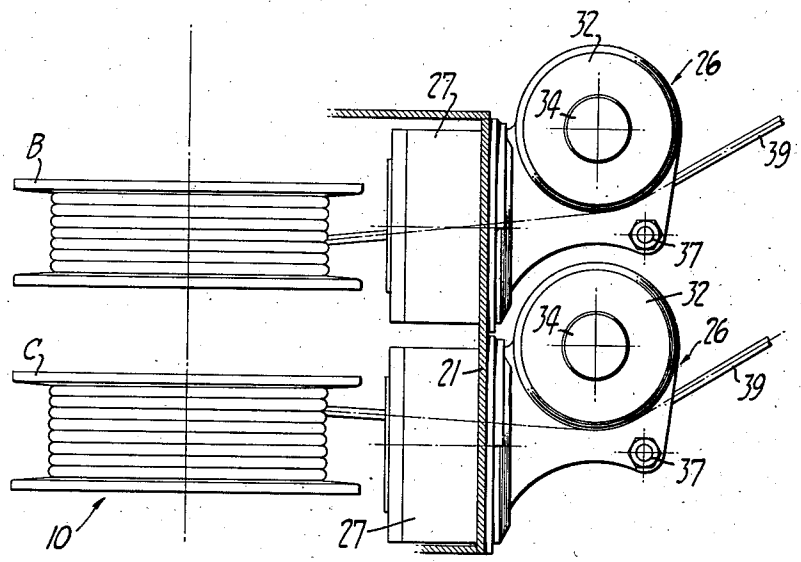
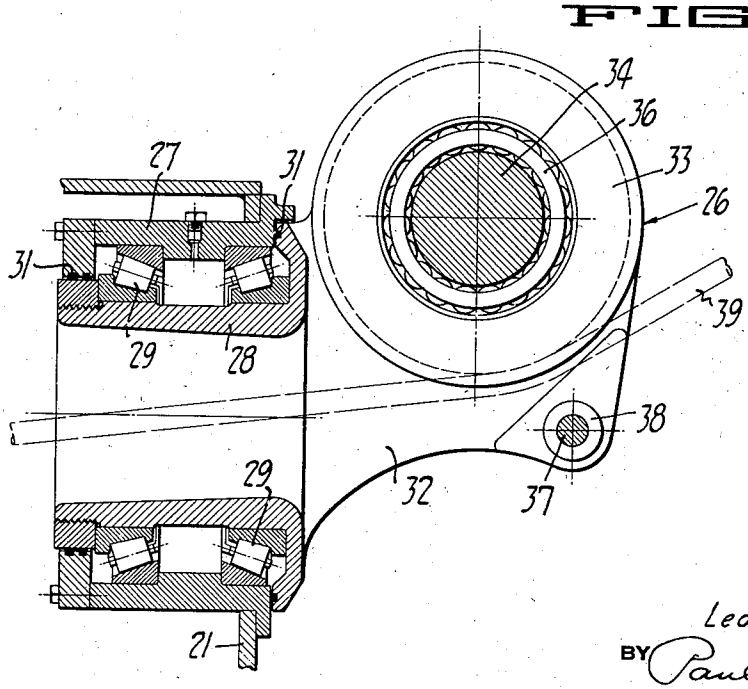


FIG_5_



INVENTOR
Leo Berner
BY Paul O. Fleh
ATTORNEY

Patented Nov. 24, 1942 2,303,020

UNITED STATES PATENT OFFICE

2,303,020

FAIR-LEAD CONSTRUCTION

Leo Berner, San Jose, Calif., assignor to Wooldridge Manufacturing Company, Sunnyvale, Calif., a corporation of Nevada

Application August 12, 1940, Serial No. 352,233

7 Claims. (Cl. 254—190)

This invention relates generally to winch units of the type making use of a plurality of parallel drums for winding up or playing out separate ropes or cables. More particularly the invention relates to an advantageous multiple fairlead construction for multiple drum winch units adapted for attachment to present day tractors for operation of various equipment such as road making machines, hoists, scrapers, earth movers, and the like.

It is an object of the invention to provide a winch unit having an improved fairlead construction for use with a pair of adjacent winch drums to provide an increased range of relative turning movement between the draft and drawn vehicles without interference between the cables and the adjacent parts of the mechanism such as the winch housing.

Another object of the invention is to provide an improved fairlead construction of the type referred to for a winch unit having drums mounted in side-by-side relationship about vertically disposed axes on a draft vehicle to provide an optimum relation and spacing of the respective fairleads to avoid interference therebetween.

Other objects and advantages of the invention will be apparent from the following description of a preferred embodiment thereof, which is illustrated in the accompanying drawings.

In the drawings,

Figure 1 is a side elevational view illustrating a winch construction incorporating the instant invention;

Figure 2 is a plan view of the winch unit;

Figure 3 is a rear elevational view of the fairlead construction for a pair of vertically disposed axialy aligned winch drums;

Figure 4 is a sectional elevation of the fairlead construction shown in Figure 3.

Figure 5 is a sectional view through one of the fairleads, the view being taken in a plane indicated by the line 5—5 in Figure 2.

The winch construction illustrated in the drawings is of the general character disclosed and claimed in Hutchins Patent No. 2,171,792, granted September 5, 1939, and entitled "Attachment for tractors and the like," as modified in the copending application of Gerald I. Clark, Serial No. 305,224, filed November 20, 1939, Patent No. 2,270,507, dated January 20, 1942, for "Winch construction." The winch unit disclosed in the present application has a pair of vertically aligned drums controlled from a single lever on one side, and a single drum on the other side. In conjunction with the drums shown, additional drums can be employed for handling supplemental ropes or cables. The cables from the drums are trained around respective fairleads mounted for rotation about respective horizontal axes arranged obliquely with respect to the longitudinal axis of the winch unit.

Referring to Figures 1 and 2, the winch unit is designated generally at 10, and is shown applied as an attachment to a tractor 11. The unit itself includes a housing 12 which carries the winch drums A, B, and C. The housing 12 is bolted to an adapter 13 which is suitably mounted on a portion 14 of the tractor through which the drive shaft (not shown) extends. Each drum may be suitably connected to the drive shaft by means of a worm and worm gear connection and is provided with a suitable clutch mechanism and brake mechanism indicated generally at 16 and 17, which may be controlled by means of an operating control shaft 18 provided with a suitable hand lever (not shown).

For the purposes of the present invention, it is sufficient to understand that by suitable manipulation of the shafts 18, any one of the drums A, B, or C may be selectively controlled to either play out or wind up cable.

As seen in Figure 2, the housing 12 is provided with a substantially V-shaped rear wall formed by respective end plates 21 and 22 which are suitably secured as by welding to the side walls 23 and central structure 24 of the housing 12 and are disposed at an oblique angle with respect to each other. End plates 21 and 22 are similar and serve to mount similar fairlead units indicated generally at 26. Referring to Figures 3 to 5, the end plate 21, for example, has suitable vertically spaced apertures to receive respective bearing cages 27, in each of which the hub 28 of a fairlead unit 26 is journaled by means of suitable bearings 29. Conventional seals 31 may be provided between the unit and its bearing cage. Each fairlead unit includes spaced journal arms 32 formed integrally with hub 28 and in which the fairlead sheave 33 is journaled on a suitable stub shaft 34 by ball or roller bearing 36. Shaft 34 is offset from hub 28 to place sheave 33 substantially tangent to the hub axis. The opposite journal arms 32 of each fairlead unit are connected by a bolt 37 which extends through a spacing sleeve 38.

In order to limit swinging movement of a fairlead unit, respective stop arms 41 (Figure 3) may be provided at either side to engage the journal arms 32.

Each fairlead sheave 33 is adapted for engagement by a cable 39 which extends inwardly through the hub 28 of the fairlead unit and is wound about the associated winch drum. The position of the fairlead unit with respect to the associated drum is such that a tangent line to the sheave at the point of first contact of the cable therewith (the center line of hub 28) is also tangent to the median wound diameter of the cooperating drum.

It will be noted that the axes *a* of the fairlead units have an oblique relation with reference to the longitudinal axis of the winch unit, which is considered to be a line perpendicular to and equidistant from the axes of adjacent winch drums. Also, the axes *a* include an acute angle. Because of the angular relation of the fairleads to each other, a horizontal spacing for clearance is provided between horizontally aligned cables, for example, as indicated at **39***a* and **39***c* in Figure 2 where the horizontal position of a pair of horizontally spaced sheaves is indicated in dotted lines.

Also, the angular location of the fairlead axis positions a fairlead sheave during an inside turn so that its cable can be wound about the sheave for about 180° without interfering with the structural portion of the winch unit.

In operation, the respective cables **39** are attached to their drums A, B, and C and trained over the associated fairleads and thence to suitable sheaves located on the drawn equipment. As the tractor turns, the relative turning movement between the tractor and the drawn equipment will cause swinging of the fairleads about their axis in either direction from their straight ahead position, wherein they lie substantially in the line extending from the winch drum of the winch unit to the associated sheave on the drawn vehicle. As relative turning movement is effected between the tractor and the drawn vehicle, for example, a left-hand turn as shown in Figure 2, the swinging of the fairlead sheaves toward their horizontal position produces a longitudinal displacement between the respective horizontally parallel cables so that no interference can occur. As clearly seen in Figure 2, the drawn equipment can be positioned substantially at a right angle to the tractor without any touching of the adjacent cables. At the same time the arrangement is such that the cables can be played out or wound up in the extreme turning position shown in Figure 2 without any undue strain on the cables or the winch unit itself.

I claim:

1. A winch construction comprising a housing, at least two winch drums, means mounting said drums in said housing with their axes parallel and vertical, said housing including a pair of vertically disposed end plates positioned to include an oblique angle, and a fairlead unit for each of said drums there being at least one fairlead unit journalled in each of said end plates about a horizontal axis substantially perpendicular to the related end plate.

2. A winch construction comprising a housing, at least two winch drums, means mounting said drums in said housing with their axes parallel and vertical, said housing including a pair of vertically disposed end plates positioned to include an oblique angle, and a fairlead unit for each of said drums, each fairlead unit including an apertured hub journaled in an end plate about an axis substantially perpendicular to said plate and a sheave carried by said hub and having its periphery disposed substantially tangent to the hub axis, there being at least one fairlead unit for each end plate.

3. A winch construction comprising at least two winch drums, means mounting said drums with their axes spaced parallel and vertical, a longitudinal center line perpendicular to the plane containing said drum axes and passing between said drum axes, cables on said drums, a fairlead for each of said drums to receive the respective cables therefrom, means mounting each fairlead for swinging movement about a substantially horizontal axis with the axes of said respective fairleads positioned to include an acute angle and being obliquely disposed with respect to the longitudinal axis of the winch construction.

4. A winch construction comprising at least two winch drums, means mounting said drums with their axes spaced parallel and vertical, a longitudinal center line perpendicular to the plane containing said drum axes and passing between said drum axes, cables on said drums, a fairlead for each of said drums including a sheave, and means mounting each fairlead in position to receive the cable from the associated winch drum and for swinging movement about a horizontal axis, said axis being tangent to the sheave of the fairlead, and said fairlead axes each forming an angle oblique with respect to the longitudinal center line and being symmetrically disposed with respect thereto.

5. A winch construction comprising at least two winch drums, means mounting said drums with their axes spaced parallel and vertical, a longitudinal center line perpendicular to the plane containing said drum axes and passing between said drum axes, cables on said drums, a fairlead for each of said drums, each fairlead having a sheave with an axis offset from the fairlead axis, and means mounting each of said fairleads in position to receive the cable from the associated winch drum and for swining movement about a horizontal axis disposed obliquely with respect to the longitudinal center line whereby the longitudinal position of the fairlead sheave changes as it is swung about its axis.

6. A winch construction comprising a housing, at least two winch drums, means mounting said drums in said housing with their axes spaced parallel and vertical,, a longitudinal center line perpendicular to the plane containing said drum axes and passing between said drum axes, said housing including a pair of vertically disposed end plates providing a rearward V-shape for the housing, a fairlead unit for each of said drums, there being at least one fairlead unit journalled in each of said end plates about a horizontal axis forming an angle with said longitudinal center line.

7. A winch construction including a housing having opposite side walls and an end wall, the longitudinal center line of said housing being disposed in a plane passing between said side walls and symmetrically related thereto, a drum mounted in said housing, a cable wound on said drum, and a fairlead for said cable mounted on said end wall for swinging movement about a substantially horizontal axis which diverges rearwardly from the longitudinal axis of said construction, said fairlead including an offset sheave having its periphery substantially tanget to said fairlead axis, said fairlead and said housing being constructed and arranged to place said sheave when swung toward a horizontal position with its periphery adjacent the plane of one of the side walls of said housing.

LEO BERNER.