

J. R. McGIFFERT.
 VARIABLE SPEED TRANSMISSION MECHANISM.
 APPLICATION FILED JAN. 2, 1913.

1,143,547.

Patented June 15, 1915.

2 SHEETS—SHEET 1.

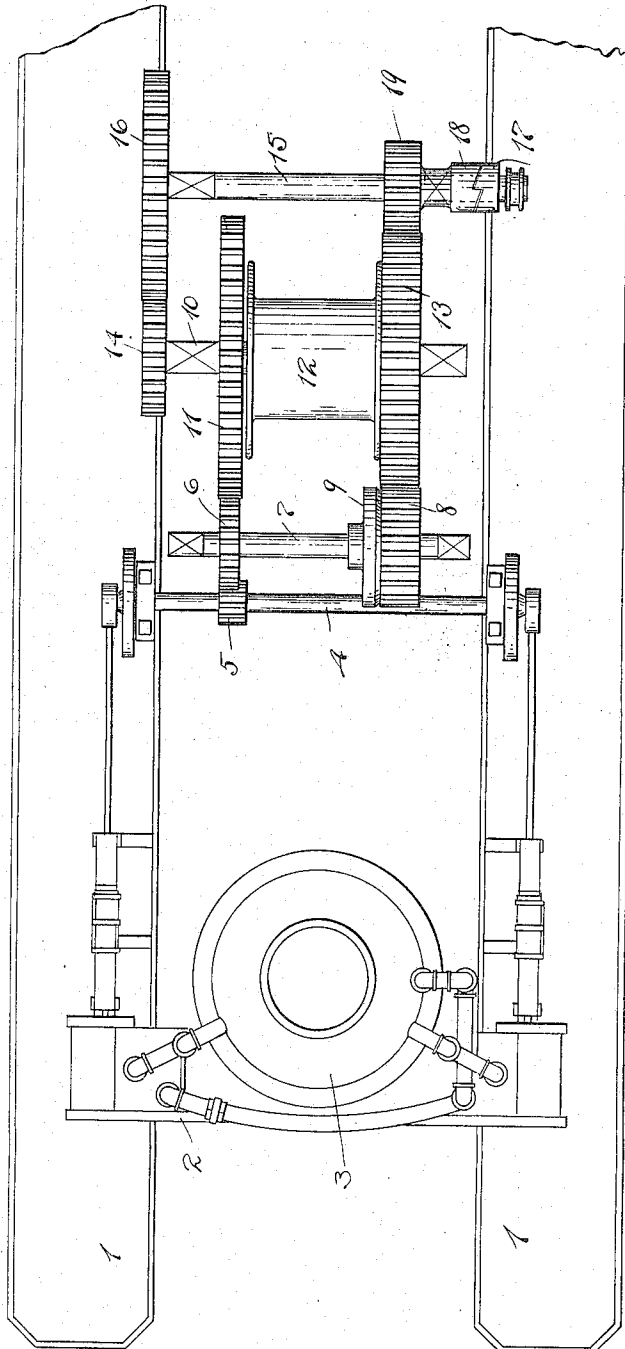


FIG-1

WITNESSES=

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INVENTOR.

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 ATTORNEYS -

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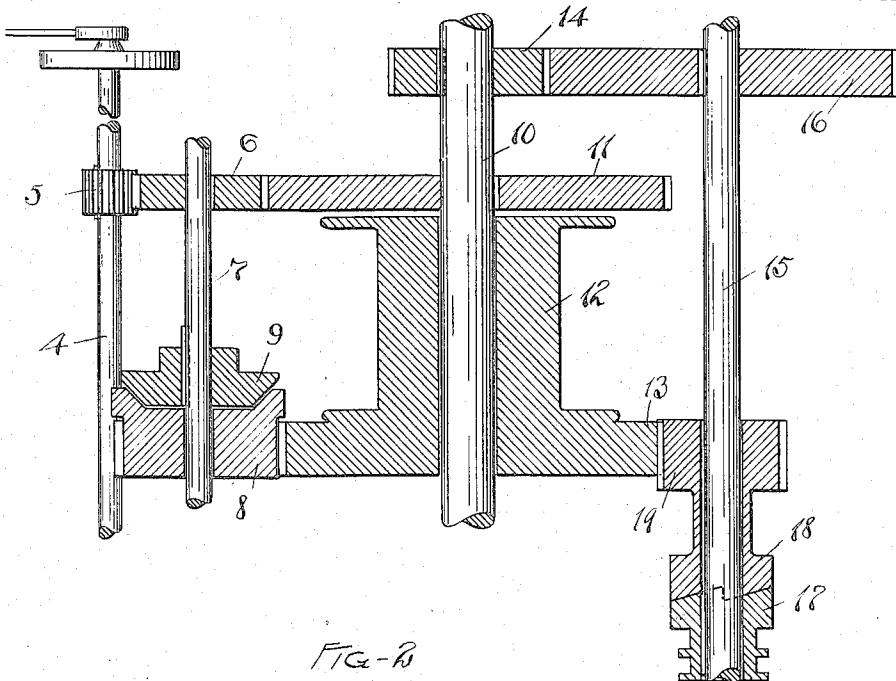


FIG-2

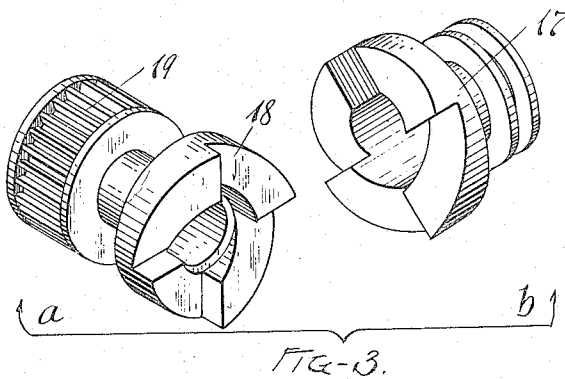


FIG-3.

WITNESSES=

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UNITED STATES PATENT OFFICE.

JOHN R. McGIFFERT, OF DULUTH, MINNESOTA, ASSIGNOR TO CLYDE IRON WORKS, OF DULUTH, MINNESOTA, A CORPORATION OF MAINE.

VARIABLE-SPEED-TRANSMISSION MECHANISM.

1,143,547.

Specification of Letters Patent.

Patented June 15, 1915.

Original application filed January 31, 1912, Serial No. 874,538. Divided and this application filed January 2, 1913. Serial No. 739,692.

To all whom it may concern:

Be it known that I, JOHN R. McGIFFERT, a citizen of the United States, and a resident of Duluth, county of St. Louis, and State of Minnesota, have invented a new and useful Improvement in Variable-Speed-Transmission Mechanism, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying the principle, so as to distinguish it from other inventions.

The present invention relates to mechanism for winding in cables and is adapted to provide a plurality of speeds, the speed being varied to correspond with the change in load on the cable. With such qualities my invention is adapted for use in land clearing machines for removing stumps where it is desired to secure a pulling speed of about thirty feet per minute during the removal of the stump and a speed of several hundred feet a minute during the hauling of the stump to the place of temporary deposit. The invention may, therefore, be used for the above purpose in connection with such a machine as is described in my co-pending application, Serial Number 674,538, filed January 31, 1912, out of which the present application has been divided, although the field of usefulness is not limited to the adaptation above mentioned as many other uses will readily suggest themselves.

To the accomplishment of these and related ends said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings: Figure 1 is a plan view of my invention mounted upon a suitable frame; Fig. 2 is a diagrammatic sectional view showing the general arrangement and preferred construction of the invention; and Fig. 3 is a view in perspective of certain details of construction.

In Fig. 1 is shown a suitable base or frame consisting of parallel side members 1 connected by cross members 2. The members 1 are here shown in the form of skids but may be adapted to the conditions under which the mechanism is to be used. On the frame is mounted an engine 3 of any suitable type connected to drive a power shaft 4 mounted in suitable bearings on the frame. A gear 5 is keyed or otherwise fixed to the shaft 4 and engages a second gear 6 keyed to a shaft 7 disposed parallel to said power shaft. Another gear 8 is rotatably mounted on the shaft 7 but may be driven thereby through a clutch 9 fixed to the shaft, but adapted to slide into engagement with said gear 8. A third shaft 10 is disposed parallel to said first-named shafts and bears a fixed gear 11 engaging the gear 6 on shaft 7. A suitable driven member here shown as a drum 12, is mounted rotatably on the shaft 10 and has attached to it, or preferably integral therewith, a gear 13 which engages the gear 8 on shaft 7. The shaft 10 bears another gear 14 fixed thereon. A fourth shaft 15, parallel to the other shafts, bears a fixed gear 16 engaging gear 14 on shaft 10.

The driving member 17 of a jaw clutch is keyed to the shaft 5 but is longitudinally slidable thereon into driving engagement with a complementary driven jaw clutch member 18 attached to a gear 19 rotatable on the shaft 15. The gear 19 engages the gear 13 attached to the drum 12. The jaw clutch member 17 is adapted to drive the complementary clutch member 18 in but one direction only, as may be readily seen from an inspection of the conformation of the clutch members to be seen in Fig. 3, the two parts of the clutch being indicated by the reference characters *a* and *b*. Should a greater speed be given the member 18 than the member 17, the former will disengage from the latter by forcing it outward upon the shaft 15.

Suitable operating means may be provided for controlling the clutch 9 and the clutch member 17. The clutch 9 is normally disengaged and the clutch 17 engaged. In this way a slow speed drive is provided for

the winding drum 12 which will operate the main hauling cable (not shown). The slow speed drive for the drum is through gears 5, 6, 11, 14, 16, 19 and 13, and by variously proportioning these gears any desired speed can be secured. During the first few feet the load is heavy and the drive will be through the gears named in order to secure the hauling effect of a large gear reduction.

Upon the removal of the stump from the ground, the load is decreased and a faster pulling speed is therefore desired. To secure this speed the operator engages clutch 9 with gear 8 causing the latter to drive the drum in the same direction as before but at a much greater speed. The increased rotative speed of gear 13 causes a corresponding increase in the speed of gear 19 and hence of clutch member 18. The latter disengages from clutch 17 and the drum is then connected to the power shaft through gears 8 and 13 only.

It will be noted that the initial or low gear drive does not disengage until after the high speed drive has not only engaged but begun to operate. In this way all shock on the mechanism is avoided, saving the various parts and cables. The use of a friction clutch to engage the gear 8 further prevents shock although any other suitable clutch mechanism may be used if desired. While it is necessary for an operator to engage this clutch, yet the high gear controlled by the clutch causes the disengagement of the low gear at the proper moment. The change speed action may therefore be said to be semi-automatic in character, and the advantage of this feature in such a device will be appreciated by those familiar with the art.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. In mechanism of the character described, the combination of a rotatable driving member; a gear operated thereby; a second gear operated by said first-named gear; a driven member; a third gear attached to said driven member; low speed driving means operatively connecting said second gear and said gear on said driven member; and high speed driving means operatively connecting said second gear and said gear on said driven member, said low speed means including a one-way connection adapted to disengage upon the operation of said driven member by said high speed means.

2. In mechanism of the class described,

the combination of a rotatable driven member; a rotatable driving member; a gear attached to said driven member; a second gear engaging said first-named gear; one-way clutch means detachably connecting said second gear and said driving member, said gears constituting low speed driving means for said driven member; a third gear also engaging said first-named gear, said third gear constituting a high speed driving means for said driven member; and clutch means operatively connecting said third gear to said driving member, said one-way clutch means being adapted to disengage when said driven member is operated at high speed.

3. In mechanism of the class described, the combination of a rotatable driving shaft; a rotatable driven member; two shafts connected to be driven by said driving shaft; a gear attached to said driven member; a second gear rotatably mounted on one of said shafts and engaging said first-named gear; a one-way spiral jaw clutch adapted to connect said second gear to the shaft to be driven thereby; a third gear rotatably mounted on said other shaft and engaging said first-named gear; and a manually operative clutch adapted to connect said third gear to said other shaft to be driven thereby, said second gear being smaller than said third gear whereby said second gear is disengaged from said one-way clutch means upon the rotation of said driven member by said third gear.

4. In mechanism of the class described, the combination of a rotatable driving shaft; a rotatable driven member; two spaced shafts disposed parallel with and adjacent to said driving shaft and said driven member and connected to be driven by said driving shaft; a gear fixedly attached to said driven member; a second gear rotatably mounted on one of said shafts; one-way spiral jaw clutch means adapted to operatively connect said second gear to be driven by said shaft; a third gear rotatably mounted on said other shaft and engaging said gear on said driven member; and friction clutch means adapted to connect said third gear to said shaft to be driven thereby; said drive through said other shaft being adapted to rotate said driven member at high speed, thereby causing said spiral jaw clutch to disengage in such other or low speed drive.

5. In mechanism of the class described, the combination of a rotatable driven member; a rotatable driving member; a gear attached to said driven member; a second gear engaging said first-named gear; and means including a one-way clutch detachably connecting said second gear and said driving member, said gears constituting low speed driving means for said driven member; a third gear meshed with said gear on said

driven member, but normally inoperative to
drive the latter, said third gear being adapt-
ed, when operated, to drive said driven mem-
ber at high speed; and clutch means adapted
5 to render said third gear operative to drive
said driven member at such high speed.

Signed by me, this 23rd day of December,
1912.

JOHN R. McGIFFERT.

Attested by—

M. W. LEPP,

Q. E. WAGNER.