Dec. 30, 1924. 1,520,735

T. B. WEBB

DITCHING MACHINE

Filed Sept. 4, 1923 2 Sheets-Sheet 1

Fig. 1

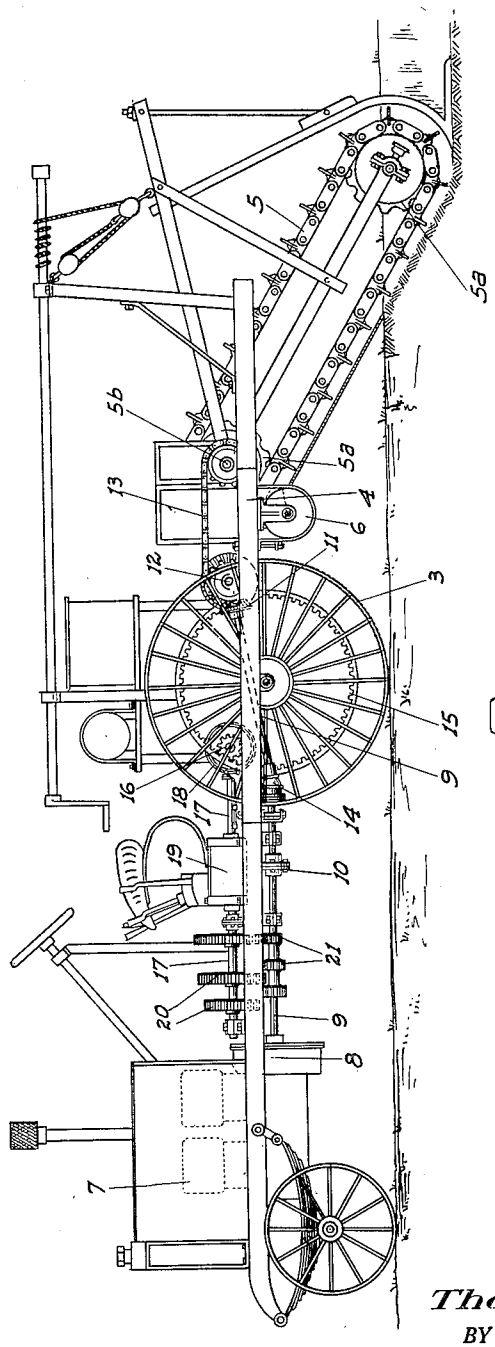
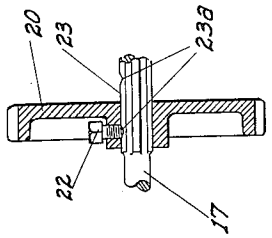


Fig. 3



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Filed Sept. 4, 1923 2 Sheets-Sheet 2

Fig. 2

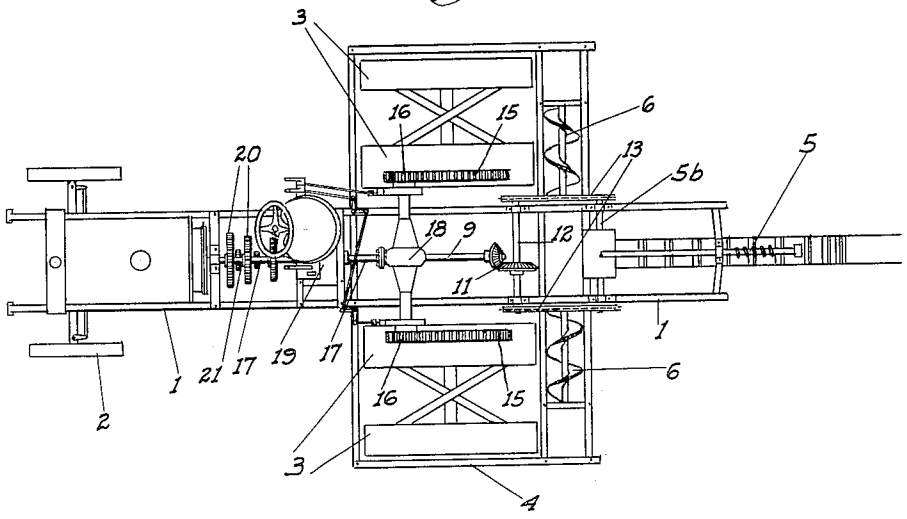


Fig. 4

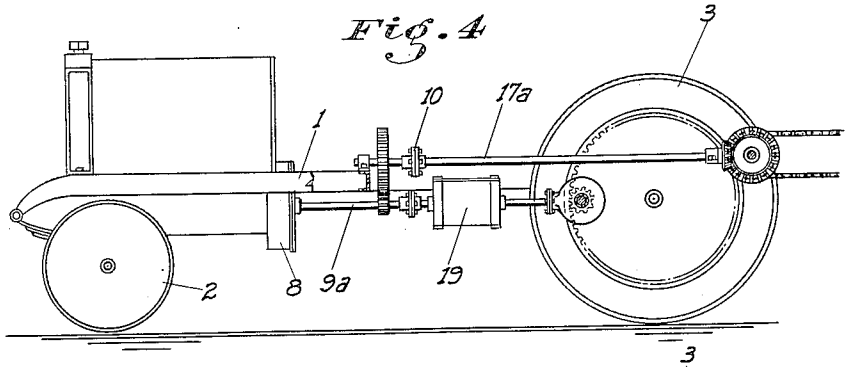
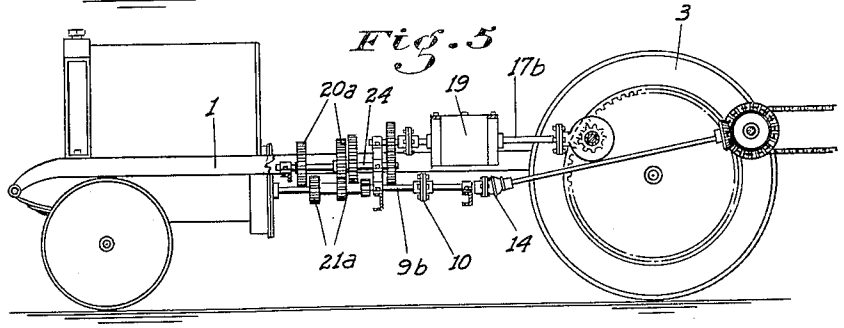


Fig. 5



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1,520,735

UNITED STATES PATENT OFFICE.

THOMAS B. WEBB, OF STOCKTON, CALIFORNIA.

DITCHING MACHINE.

Application filed September 4, 1923. Serial No. 660,663.

To all whom it may concern:

Be it known that I, THOMAS B. WEBB, a citizen of the United States, residing at Stockton, county of San Joaquin, State of California, have invented certain new and useful Improvements in Ditching Machines; and I do declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this application.

This invention relates to improvements in self-propelled ditch-digging machines, the principal object being to provide a driving mechanism for the propulsion of the machine along the ground, and for operating the digging structure, so arranged that with a single power plant for both purposes, the speed of movement along the ground may be changed relative to the speed of the digging structure.

This I believe to be a highly important and necessary feature, since any machine of this character may be called upon to work in many different kinds of ground so that with a more or less fixed speed of the digging structure, if the traveling speed of the machine is nonadjustable with regard to the digging speed, what would be the correct rate of movement of the machine in soft ground would be too fast when digging in hard ground, or if the machine were constructed to travel at an efficient speed in hard ground, this speed would be too slow, entailing a waste of time and power when working in soft ground.

My variable-speed driving mechanism overcomes this defect, inherent in most machines, and I am enabled to operate the machine to the best advantage under all conditions.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views:

Fig. 1 is a side outline of a ditching machine showing the preferred type of mechanism mounted in connection therewith.

Fig. 2 is a top plan view of the same.

Fig. 3 is an enlarged fragmentary view showing an adjustable gear member.

Figs. 4 and 5 are more or less diagrammatic elevations of modified forms of drive mechanisms.

Referring now more particularly to the characters of reference on the drawings, and especially at this time to Figs. 1, 2 and 3, the numeral 1 denotes the main framework of the machine, supported on front wheels 2 and wide-faced driving wheels 3 somewhat to the rear.

These driving wheels are in two pairs as shown in Fig. 2, those of each pair being spaced somewhat apart but connected together and mounted in an auxiliary transverse frame structure 4 outside the main frame 1.

Mounted centrally of the frame 1 and depending therefrom behind the wheels 3 is the digging structure 5, of the usual chain and digger-plate type, having upper and lower chain sprockets 5^a. The forward and upper end of this digger is adapted to discharge into a horizontal and transverse conveyor 6, mounted on the auxiliary frame 4 to the rear of the wheels 3 and extending for equal distances on both sides of the digger.

Mounted on the frame 1 at the front end thereof is a power plant, preferably a gas engine indicated at 7. The usual clutch indicated at 8 is interposed between the engine shaft and the propeller shaft 9. This shaft, a certain distance to the rear of the clutch 8, preferably has a coupling 10 interposed therein, and then extends to a bevel-gear connection 11 with a countershaft 12 mounted on the frame 1 ahead of the conveyor 6, the ends of said shaft being connected to the ends of the upper digger sprocket-shaft 5^b by chain drives 13. In this manner, the strain on the digger shaft is evenly distributed, while its driving means are positioned so as not to be in the way of dirt falling from the digger into the conveyor.

Since in this type of machine the propeller shaft 9 is below the plane of the shafts 12 and 5^b, a universal joint 14 is interposed in said shaft 9 a suitable distance rearwardly of the coupling 10.

The drive wheels 3 are driven by means of internal gears 15 mounted in the adjacent ones of the pairs thereof which are

enmeshed with pinions 16 driven from a shaft structure 17 in vertical alinement with and above the shaft 9, through the usual bevel or worm gear and differential structure commonly employed on motor vehicles, the housing of which structure is shown at 18.

While the shaft 17 is here described for convenience as being one piece, it is not actually so, since a change-speed transmission structure of usual character such as is used in automobiles, and which is indicated at 19, is interposed therein.

Splined on the shaft 17 ahead of the transmission is a plurality of independent and different sized gears 20, any one at a time of which is adapted to be engaged with the corresponding one of a number of pinions 21 on the shaft 9.

The gears 20 are to be adjusted by hand, so that at the commencement of operations the speed of that portion of the shaft 17 ahead of the transmission 19 may be fixed relative to the speed of the shaft 9. The spacing of said gears and pinions on their respective shafts, is such that when any pair is in mesh, the other movable gears may be shifted along the shaft so as to be out of contact with the other pinions. Assuming that each gear 20 has two definitely located positions in which it may be placed, one in mesh and the other clear of its pinion, a simple manner to so locate the said gear without much effort is by means of a set screw 22 in the gear hub, adapted to seat in either one or the other of a pair of definitely located notches 23^a in one of the splines 23 of the shaft 17. This permits of a quick location of the gear and prevents undesired slippage thereof along the shaft.

It will therefore be seen that the drive to the digger is direct from the engine, the speed of which would be throttled to give the desired digger speed. The speed of the auxiliary shaft 17, from which the wheels 3 are driven, may be varied to have as many different speeds relative to that of the shaft 9, with a common engine speed, as there are gears in the box 19, in addition to the manually adjustable gears 20. The clutch 8 enables the engine to be entirely disconnected from the wheels and digger, while the coupling 10 in the drive to the latter allows the digger to be disconnected from the power while still enabling the machine to travel along the ground.

In the arrangement of the drive mechanism shown in Fig. 4, the propeller shaft 9^a drives direct to the rear wheels 3, while the upper shaft 17^a, gear-driven from shaft 9^a, drives direct to the digger structure, without the use of any universal joint in either shaft. The same complement of clutches, transmission, auxiliary slidable gears, and other features are mounted in connection with this drive arrangement as with that previously described.

In the second modified form of drive as shown in Fig. 5, the arrangement as a whole is the same as that shown in Fig. 1. That is, the engine drive is direct to the digger, and indirectly to the wheels. The wheel drive shaft 17^b however instead of being geared directly to the propeller shaft 9^b, is geared to a countershaft 24 which has the auxiliary shiftable gears 20^a thereon, adapted to mesh with the pinions 21^a on the shaft 9^b.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described my invention what I claim as new and useful and desire to secure by Letters Patent is:

1. A ditching machine having supporting wheels, a digging element and a power plant, a primary shaft connected in direct driving relation between the power plant and the digging element, a secondary shaft arranged in driving relation with the primary shaft and with the supporting wheels, and a change speed transmission gearing element interposed in the secondary shaft between its driving connection with the first shaft and the wheels, whereby the speed at which the wheels are driven relative to the speed of the digging element may be varied at will.

2. A ditching machine having supporting wheels, a digging element and a power unit, a primary shaft connected in direct driving relation between the power plant and the digging element, a secondary shaft arranged in driving relation with the primary shaft and with the supporting wheels, a coupling interposed in the primary shaft between its driving connection with the secondary shaft and the digging element whereby the drive of such digging element may be broken without disturbing the drive of the secondary shaft, and a selective change speed transmission gearing element interposed in the secondary shaft between its driving connection with the primary shaft and the wheels whereby, after the drive of the digging element has been disconnected, the machine may be driven on its wheels at different desired speeds.

In testimony whereof I affix my signature.

THOMAS B. WEBB.