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TRACTOR CONTROL
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Fig. 1

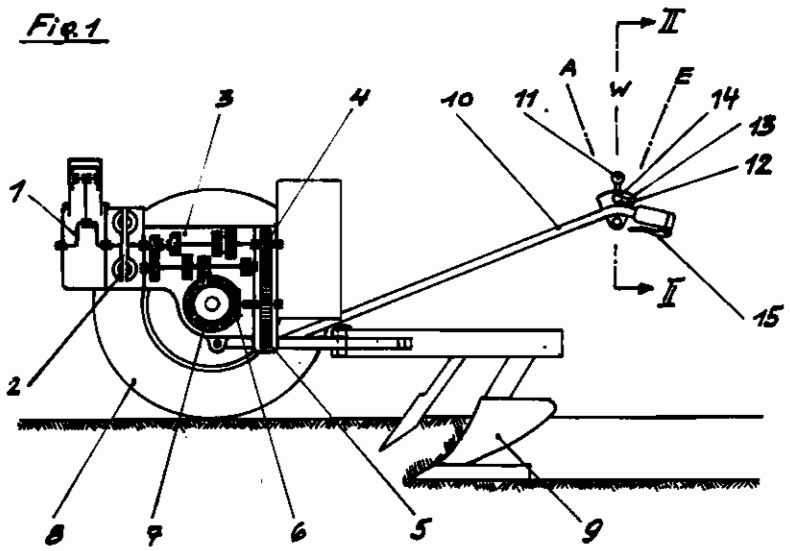


Fig. 2

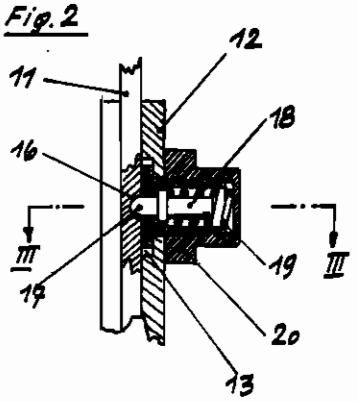
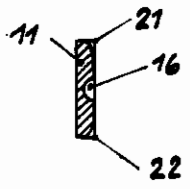


Fig. 3



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ALIEN PROPERTY CUSTODIAN

TRACTOR CONTROL

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vested in the Alien Property Custodian

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This invention relates to improvements in tractor control and more particularly to the control of the power transmitted from a tractor engine to the driving wheel.

An object of this invention is the provision of an improved arrangement for controlling a tractor in accordance with the characteristics of a load upon said tractor.

Another object of this invention is the provision of a fluid coupling intermediate the engine and driving wheels of a tractor.

A further object of this invention is the provision of a novel arrangement for controlling the speed of a tractor engine connected to the driving wheels through a fluid coupling.

A more specific object of this invention is to provide a simple control for the engine of a tractor connected to the driving wheel through a fluid coupling, which permits the complete attendance of the operator to the control of the load, such as a plow or other soil working devices.

With these and incidental objects in view, the invention consists in certain novel features of construction and combination of parts which are set forth in the appended claims, and a preferred form of embodiment whereof is hereinafter described with reference to the drawings which accompany and form part of the specification, wherein:

Fig. 1 is a side view, partially schematic and partially cut away, of a tractor arrangement illustrating a preferred embodiment of construction;

Fig. 2 is a cross-sectional view on a larger scale along the line II—II of Fig. 1; and

Fig. 3 is a cross-sectional view along the line III—III of Fig. 2.

In a preferred form of the invention, schematically illustrated in Fig. 1, the engine indicated at 1 is interconnected through the fluid coupling 2, preferably of the hydrokinetic type, speed change gearing 4, intermediate gears 4, 5 and bevel gears 6, 7 with the driving wheel 8. It will be noted that in this preferred form of construction the fluid coupling 2 acts as the sole clutching device.

The tractor is adapted to pull a load, such as a soil working device, here illustrated as a plow 9. The engine throttle and brake controls are for the convenience of the operator mounted upon the end of the plow handle 10. The throttle lever has been indicated at 11 as pivotally mounted upon a bracket 12. The bracket 12 is provided preferably with a guiding slot 13 receiving an adjustable throttle lever holding device 14, the purpose of which will be explained in more detail hereinafter. A suitable brake control for the tractor is indicated at 15. The manner in which the throttle lever 11 and the brake control 15 actuate the respective fuel supply and brakes on the main tractor body is of no particular importance with respect to this invention and have not been shown. It is sufficient to say that this control may be effected through suitable levers, wires, ropes, etc. as is well known to those skilled in this art.

It will be noted that in Fig. 1 three throttle lever positions A, W and E have been indicated. The position A, being one end position of the throttle lever provides for full running speed of the tractor. In other words, when the throttle lever 11 is in the position A sufficient fuel is supplied to the engine so that it will run at the desired working speed. The other end position E is carefully chosen so that in this position of the throttle lever 11 sufficient fuel is supplied to the engine to maintain it in continuous running operation, but, however, at such a speed that the torque developed will not be sufficient to start the tractor and its accompanying load. This arrangement is only made possible by the use of the fluid coupling 2 intermediate the engine at the driving wheel. If instead of the hydraulic coupling, the usual friction clutch were substituted it would be impossible to maintain the engine in a running condition while the tractor and its load stood still without actually disengaging the friction clutch. However, by choosing the proper speed of the engine, the resulting torque will not be sufficient to move the apparatus, but only to cause slipping of the fluid coupling. This arrangement is of extreme advantage when the soil working apparatus is being operated by a single attendant. The control of the entire arrangement is accordingly much simpler than in the usual construction heretofore used since only one operation upon the part of the attendant is required, namely moving the throttle lever into the position E. This automatically takes care of the fuel supply and at the same time it is not necessary to actuate other levers such as a clutch lever. This arrangement becomes of more particular importance when the tractor is pulling a load such as a plow and meets an obstacle such as a large stone which will tend to stop the tractor.

In the operation of soil working devices, such as plows, frequent turning is often required such as when the plow comes to the end of a furrow,

as for example, in a small field. At such a time, it is obvious that the speed of the tractor must be reduced in order that the turning operation can be easily carried out. At the same time the attendant must work the plow such as lifting it up and putting it down again in the new position. By means of the novel control disclosed in the present invention, the attendant can turn all his attention to the proper operation of the plow, as the speed of the tractor will be automatically taken care of. The intermediate position of the throttle lever indicated in Fig. 1 as W is such a position as will supply sufficient fuel to the tractor engine to give a proper turning speed. In order that this position will be maintained I have provided a special type of abutment or holding device so that when the lever is once in its proper turning-speed position no further operation of the throttle on the part of the operator is necessary.

The releasable holding device for the throttle lever 11 in its intermediate or turning-speed position is illustrated in more detail in Figs. 2 and 3, drawn upon a larger scale than the comparable parts illustrated in Fig. 1. The throttle lever is first provided with a small cut-out portion 16 of a size suitable to receive the head 17 of an engaging pin 18. This pin is urged toward the lever by means of a spring 19, and when the pin head 17 and cut-out portion 16 coincide, engagement will result. The spring means 19 reacts against a nut 20 threaded upon a slider in the slot 13 of the bracket 12, which at the same time permits adjustment of the slider within this slot. It will be seen that upon unscrewing the nut 20 the slider may be moved to any position within the slot and that upon tightening the nut the slider together with its pin 18 will be held in the desired position. This adjustability of the turning-speed position of the throttle lever is desirable since the turning-speed may vary depending upon the type of soil working device, type of soil, or speed of the apparatus.

In order that time may be saved in placing the throttle lever in the correct turning-speed position, the throttle lever 11 may, if desired, be formed with shallow curved depressed portions on either side of the cut-out portion 16 in the direction of the acuate path of engagement between the pin 18 and the cut-out portion 16. Such depressed portions are illustrated in Fig. 3 as 21 and 22. It will be obvious that these portions facilitate moving the throttle lever 11 into the turning speed position, but do not effect the holding function of the cut-out portion 16.

As pointed out in the previous paragraph, provision is made for adjusting the locked turning-speed position of the throttle lever as desired. In some cases this may be placed at such a position that when the throttle lever is moved into its locked position the engine will not develop sufficient torque to drive the tractor and its accompanying load through the fluid coupling, but the engine speed will be maintained due to the slip of the fluid coupling. However, upon removal of the load, such as the lifting of the plow, the tractor will then move at the chosen turning speed until the plow is re-inserted into the ground. At that point the throttle lever will then be turned into the running position A for the plowing of the next furrow. By means of this type of control the operator may devote his entire attention to the turning of the tractor and the turning of the plow and no thought need be given to any control of the tractor engine itself.

Many of the advantages of the use of a hydraulic coupling intermediate a tractor engine and its driving wheel are at once apparent from the description of the invention as set forth above. As contrasted with the usual friction clutch, there are still further advantages. The shocks on the wheel and transmission, which are particularly severe in soil working operation, will not be transmitted to the engine through a fluid coupling as they are when a friction clutch is used. Not only do such shocks adversely affect the engine, but in addition react upon the friction clutch which must constantly be maintained in repair and such repairs are often necessary at a time when it is important that the tractor be used. By the use of a hydraulic coupling, on the other hand, such maintenance and repair are comparatively negligible. It will accordingly be seen that by using a hydraulic coupling in the manner proscribed there will be a resulting saving in both time and expense.

It will be obvious to those skilled in the art that the advantages of the proposed construction are not limited to the precise arrangement illustrated and described above. The use of the fluid coupling together with its attendant control is applicable to any type of tractor and in connection with any suitable source of power. As previously stated, the particular manner of effecting the control from the lever is unimportant as their manner and place of mounting. While only one arrangement of throttle control has been illustrated and described, it will be obvious, that in the broader sense, any similar type of control can be used. The essence of the invention lies in the use of the fluid coupling intermediate the tractor engine and its driving wheel which will provide an apparatus which will be of all the flexibility of control of the soil working apparatus as is true when such apparatus is pulled by farm horses or other working animals.

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