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CONCRETE MIXING, CARRYING AND POURING ATTACHMENT FOR A TRACTOR

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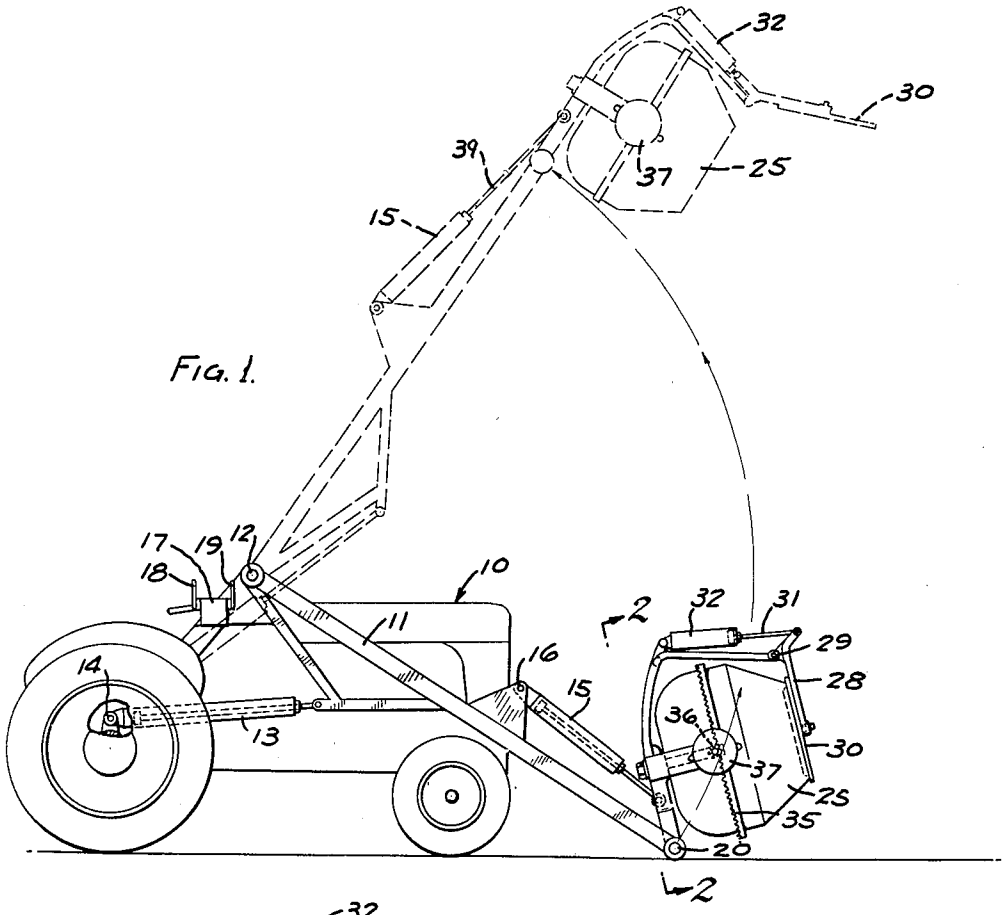


FIG. 1.

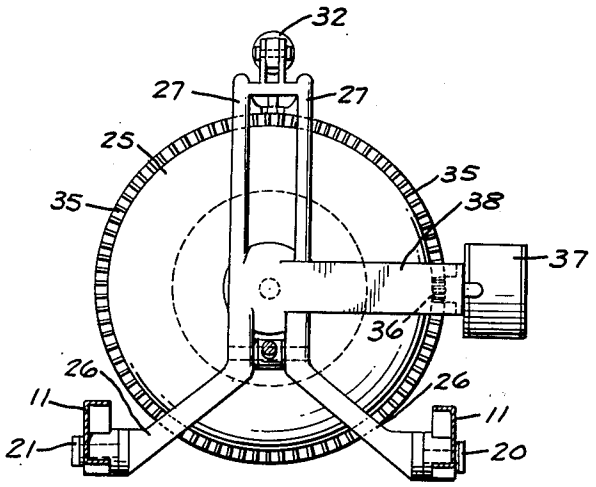


FIG. 2.

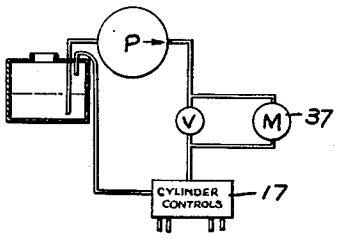


FIG. 3.

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CONCRETE MIXING, CARRYING AND POURING ATTACHMENT FOR A TRACTOR

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12 Claims. (Cl. 259—161)

This invention relates to tractors and more particularly to an improved concrete mixing, carrying and pouring attachment therefor.

The present practice in construction work wherein mixing and pouring of concrete in relatively small quantities is required, is to load ingredients into a concrete mixer constituting a separate machine and thoroughly mixing such ingredients therein with addition of water. Thereupon the contents of the mixer are emptied into a wheelbarrow, and the wheelbarrow is rolled away on boards to the place where the concrete has to be poured. The ingredients, and particularly sand and gravel, are dumped in piles on the construction site and therefore they have to be brought to the mixer in a wheelbarrow or in some other manual way. In many cases such ingredients have to be brought through a substantial distance over rough or broken ground, particularly in spring or rainy weather when ingredients cannot be brought by delivery trucks sufficiently close to the place of pouring due to mud. In many cases the practicable location of the concrete mixer may also be at considerable distance from the place where the concrete is to be poured, and therefore the work of mixing and pouring concrete involves considerable amount of manual labor in such transportation operations.

In many cases, particularly when concrete is to be poured at an elevated point, a concrete pouring bucket attached to a tractor-mounted loader is utilized. However, such an expedient merely substitutes the use of a tractor for the wheelbarrow but does not eliminate the carrying operations explained above and does not decrease them or make the concrete mixing and pouring operations more efficient.

One of the objects of the present invention is to provide an improved concrete mixing, carrying and pouring attachment for a tractor loader, whereby the above difficulties and disadvantages are overcome and largely eliminated, and efficiency of concrete mixing and pouring operations are greatly increased.

Another object of the present invention is to provide a tractor attachment of the foregoing nature, whereby the need for a concrete mixer and its carrying to a construction job or continued presence thereat is completely eliminated in many situations.

A still further object of the present invention is to provide a concrete mixing, carrying and pouring attachment for a tractor, whereby manual carrying of the ingredients to a stationary located mixer is eliminated, and such ingredients are picked up at their respective storage places on the construction site and mixed in the same container from which they are finally poured.

A further object of the present invention is to provide an improved attachment for a tractor, requiring application of rotative power, with said power being produced by a rotary hydraulic motor deriving its power from a pump driven by the tractor engine.

A still further object of the present invention is to provide an improved concrete mixing, carrying and pouring attachment for a tractor which can mix and transport mixed ingredients over rough ground without the danger of spilling the concrete on the ground or on the tractor.

A still further object of the present invention is to provide an improved concrete mixing, carrying and pouring attachment for a tractor, whereby time is saved by mixing concrete while carrying the same, and material is saved by preventing setting of leftover quantities

of concrete that cannot be poured immediately, by continued running of the mixer and pouring such quantity later in the day.

A still further object of the present invention is to provide an improved attachment of the foregoing character, which may be attached to a tractor operated loader and detached therefrom in an easy and simple manner.

It is an added object of the present invention to provide an improved concrete mixing, carrying and pouring attachment for a tractor, which is simple and rugged in construction, safe and dependable in use, is relatively inexpensive to manufacture, and is easy to repair and service.

Further objects and advantages of this invention will be apparent from the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification, wherein like reference characters designate corresponding parts in the several views.

Fig. 1 is an elevational view showing a tractor with a loader carried thereby provided with an improved concrete mixing, carrying and pouring attachment embodying the present invention.

Fig. 2 is a view taken on the rear end of the concrete mixing drum, said view being taken in the direction of the arrows on the section plane passing through the line 2—2 of Fig. 1.

Fig. 3 is a diagram illustrating the hydraulic control circuit for the attachment of Figs. 1 and 2.

It is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also it is to be understood that the phraseology and terminology employed herein is for the purpose of description and not of limitation.

In accordance with the invention I discard the conventional practice of providing a tractor with a concrete pouring bucket attachment adapted to receive for carrying and pouring the mixed concrete from a concrete mixer forming a separate and self-sustaining machine, to which mixer the concrete ingredients have to be manually carried either by the same tractor or by some other means. I provide an improved attachment which combines in itself the functions of a concrete mixer and of carrying and pouring bucket, and which is adapted to receive the concrete ingredients directly to mix them and to transport them to the locality of pouring and to pour the contents, reaching, if necessary, over considerable distances or raising the concrete to considerable heights.

In accordance with the invention I also eliminate completely the use of a separate engine for rotating the concrete mixing drum, which is usually a one cylinder gasoline engine; I utilize for rotating the mixing drum the power of the tractor engine, transmitting rotative power from the tractor engine to the drum through hydraulic means.

In accordance with the invention a tractor, generally designated by the numeral **10** and provided with a loader including connected side bars or dipper sticks **11** hinged on the tractor as at **12** in a manner well known in the art. The loader is operated with the aid of a hydraulic cylinder **13** to actuate the free ends of the bars **11** between their two extreme portions indicated in Fig. 1. The cylinder **13** is anchored on the tractor construction, as at **14**, in a manner well known in the art. The free ends of the bars **11** are provided with hinges adapted to receive a desired attachment. Hydraulic cylinder **15** is mounted on bars **11** in hinge brackets **16** to provide forces for operating the attachment. A hydraulic pump driven off the front end of the tractor crankshaft constitutes the source of hydraulic pressure transmitted by proper conduits or pipes (not shown) to the cylinders **13** and **15**. The conduits and consequently the cylinders **13** and **15** are controlled from the valve box **17** operated with the aid of control handles, such as **18** and **19**.

The construction so far described is a conventional one, and it is used for operating many attachments which may be connected to the bars **11** by means of pins such as **20** and **21**. My improved attachment hereinafter de-

scribed is designed to be connected by the same pins and therefore be suitable for quick and easy attachment to an existing tractor loader.

My improved concrete mixing, carrying and pouring attachment comprises a mixing drum **25** mounted for rotation on a shaft journaled in a suitable frame. In the present embodiment the frame includes bars **11** as at **20** and having extensions **27** reaching over the drum to the front thereof and having a cover-carrying link **28** hinged thereto as at **29**. One end of the link **28** carries a cover **30** adapted to close and to open the throat of the mixing drum, without interference with the rotation thereof, while its other end is bent as is shown in Fig. 1 and is hinged at its extremity to the piston rod **31** of a hydraulic cylinder **32** hingedly connected to the extensions **27** and supported thereat. The cylinder **32** is hydraulically connected to the hydraulic system operated from the valve box **17**. By virtue of such a construction, the drum **25** may be raised bodily to its uppermost position by operating the cylinder **13**, tipped over by operating the cylinder **15**, whereupon the cover **30** may be opened or closed by operating the cylinder **32**. For loading the ingredients into the mixing drum **25**, the drum is lowered to the ground, brought into a position to have its throat directed slightly upward to receive the ingredients.

Mixing means are exemplified in my improved attachment by a ring-gear **35** driven with the aid of a pinion **36** mounted on a shaft of a rotary hydraulic motor **37** of any suitable type, operatively mounted on the arm **38** supported by the legs **26** of the frame. The hydraulic fluid for operating the motor **37** is delivered thereto through suitable conduits or pipes (not shown) connected to the tractor pump mentioned above.

In operation the tractor operator drives the tractor to the source of supply of ingredients, lowering the mixing drum as described above. After the ingredients are loaded into the drum, he switches on the power to rotate the hydraulic motor **37** for rotating the drum and mixing the concrete, and proceeds to the locality where the concrete is to be poured. Pouring of the concrete is effected by actuating the controls to operate the cylinder **15**, in consequence whereof the piston rod **39** of the cylinder **15** will operate to rotate the drum-supporting frame around the hinge **20**, thereby tilting the drum. By actuating the controls to operate the cylinder **32**, the cover **30** is opened, and the contents of the drum are emptied or poured into place.

Thus, much of the movements required when separate concrete mixers are used are completely eliminated by the use of my improved attachment and the concrete mixing, carrying and pouring operations are made more efficient, simple and speedy. Moreover, manual exertion of pouring concrete, as well as accidents incident thereto are eliminated, and a single machine is made to transport the ingredients, to mix them, and to carry the mixed concrete and to pour the same.

Under some conditions it may be desired to use the drum **25** also as a scoop. If such use of the drum is contemplated, the gear **35** is recessed in the drum and may be covered by a protective shield in such a manner as to prevent it from scraping the ground or getting sand and dirt into its teeth.

By virtue of such a construction the objects of the present invention and numerous additional advantages are attained.

I claim:

1. An attachment for a tractor having an engine, said attachment comprising a loader linkage connected to the tractor for operation and adapted to have one of its ends raised to a height at least twice that of the tractor; an open top drum attached to said linkage for mixing, carrying and pouring oncrete; and a hydraulic circuit including a hydraulic pump mounted on the tractor and driven from the tractor engine, a hydraulic means to operate said linkage and drum for raising and lowering said drum and for tipping the drum to discharge its contents, a hydraulic motor for rotating the drum about its axis for mixing its contents, and a control means for selectively operating the hydraulic means and the motor, said hydraulic means and said hydraulic motor being included in the hydraulic circuit.

2. The construction defined in claim 1, wherein said drum has a cover to close its open top, and a hydraulic device is operably connected in said hydraulic circuit and is actuated by said control means for opening and closing said cover.

3. A device for mounting on the working end of a tractor attachment including linkage operatively mountable on a tractor and having a free end adapted to be raised to a height of at least twice of that of the tractor and lowered and also adapted to receive at said free end various detachable devices, and further including a hydraulic system for operating said linkage; said device comprising a drum adapted to receive concrete ingredients, a hydraulic motor adapted to rotate said drum around its axis to mix the ingredients, a hydraulic cylinder with a piston adapted to tip the drum over for pouring the ingredients and to bring it back into a position for reloading, and means to connect said device detachably to the free end of said linkage.

4. The device defined in claim 3, and including a cover, and a hydraulic cylinder with a piston for operating said cover.

5. An attachment for a tractor having an engine, said attachment comprising a linkage having an end pivotally connected to the tractor with its other end adapted to reach heights of approximately 3 times that of the tractor, a hydraulic cylinder and piston pivotally connected to the tractor and to the linkage, respectively, and adapted to raise and lower the other end of the linkage; a link member pivotally and detachably connected to said other end of said linkage and rotatably supporting a concrete mixing, carrying and pouring drum; a second hydraulic cylinder pivotally connected to said linkage at said other end thereof and carrying a piston pivotally connected to said link member and adapted to tip the drum for discharge of the drum contents; a hydraulic circuit including a hydraulic pump mounted on the tractor and driven from the tractor engine, the circuit being connected with the first and second hydraulic cylinders, and a control means interposed in said circuit to selectively operate the first and second hydraulic cylinders and pistons.

6. An attachment for a tractor defined in claim 5, including a hydraulic motor interposed in said circuit and rigidly mounted on said link member to rotate the drum, said motor being selectively operated by said control means.

7. An attachment for a tractor as defined in claim 6, including a cover hingedly secured to said drum, and a third hydraulic cylinder and piston mounted on said link member and interposed in said hydraulic circuit to open and close the cover in response to said control means.

8. In a tractor having an operator's seat, an engine and a hydraulic pump driven by said engine; a concrete mixing and pouring drum mounted on said tractor, a hydraulic circuit connected to said pump and including a hydraulic motor and a cylinder-and-piston means, said hydraulic motor being drivingly connected to said drum for rotating the latter so that the mixing operation can be performed, said cylinder-and-piston means being operably connected to said drum for tipping the latter for pouring the mixed ingredients therefrom, and control means operable from the operator's seat to control said pump, motor and cylinder-and-piston means.

9. In a tractor having an engine, a hydraulic pump driven by said engine, and a supporting structure for carrying an operator, the combination of a concrete mixing and pouring drum mounted on said tractor, a hydraulic circuit connected to said pump and including a hydraulic rotary motor and a plurality of hydraulic reciprocatory motors, said rotary motor being drivingly connected to said drum for rotating the latter so that concrete can be mixed therein, said reciprocatory motors being operatively connected between said tractor and said drum for tipping the latter for pouring the mixed concrete therefrom and for raising and lowering the elevation of said drum, and control means operable from the operator's supporting structure to control said pump, said rotary motor and each of said reciprocatory motors.

10. In a tractor having an engine, a hydraulic pump driven by said engine, and a supporting structure for carrying an operator, the combination of a drum mounted on said tractor by a linkage mechanism of sufficient length to allow the drum to be lowered below the level of the plane on which the tractor is carried so that the drum can be used as a scoop for filling itself, a hydraulic circuit connected to said pump and including a hydraulic rotary motor and a plurality of hydraulic reciprocatory

motors, said rotary motor being drivingly connected to said drum for rotating the latter about its axis, one of said reciprocatory motors being operatively connected between said tractor and said drum for tipping the latter to aid in loading and unloading the same, another of said reciprocatory motors being operatively connected between said drum and said tractor for raising and lowering the elevation of said drum, and control means operable from the operator's supporting structure for controlling said pump, said rotary motor and each of said reciprocatory motors.

11. In a tractor having an engine, a hydraulic pump driven by said engine, and a supporting structure for carrying an operator, the combination of a concrete mixing and pouring drum mounted on said tractor, a cover for said drum, a hydraulic circuit connected to said pump and including a hydraulic rotary motor and a plurality of cylinder-and-piston means, said hydraulic motor being drivingly connected to said drum for rotating the latter about its axis, one of said cylinder-and-piston means being operably connected to said drum for tipping the latter for pouring the contents therefrom, another of said cylinder-and-piston means being operably connected to said cover for raising and lowering the same, and control means operable from the operator's supporting structure for controlling said pump, said rotary motor and each of said cylinder-and-piston means.

12. In a tractor having an engine, a hydraulic pump

driven from said engine and a support for carrying an operator, the combination of a rotative drum mounted on said tractor by a linkage, a cover for said drum, a hydraulic circuit connected to said pump and including at least four hydraulic motors, the first of said hydraulic motors being drivingly connected to said drum for rotating the latter about its axis, the second hydraulic motor being operably connected to said drum for raising and lowering the elevation thereof, the third hydraulic motor being operably connected to said drum for tipping the same, and the fourth hydraulic motor being operably connected for raising and lowering said cover, and control means operable from said support for controlling the pump and each of said motors.

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