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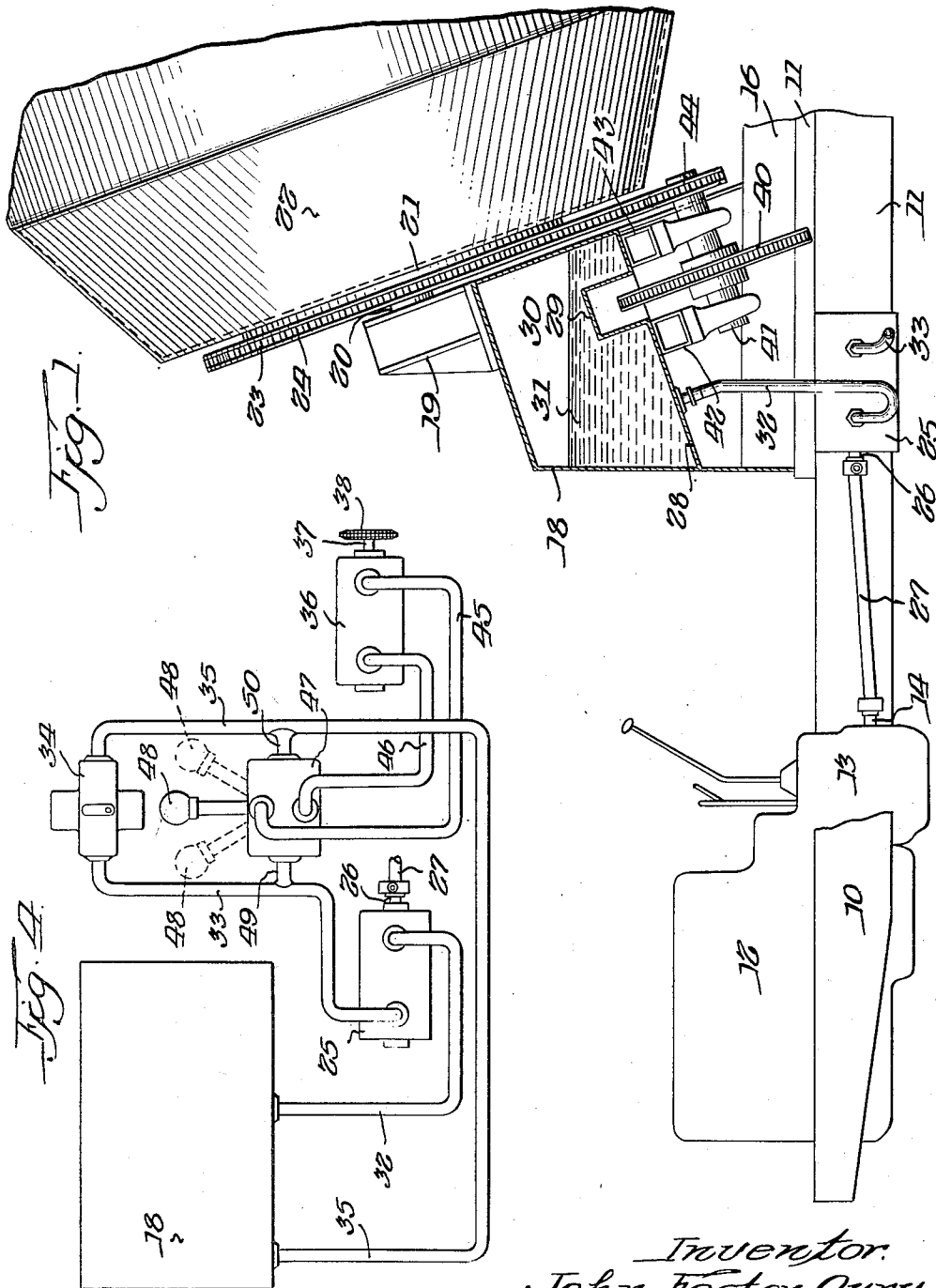
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POWER TRANSMITTING MEANS FOR TRANSIT CONCRETE MIXERS

Filed April 3, 1951

2 Sheets-Sheet 1



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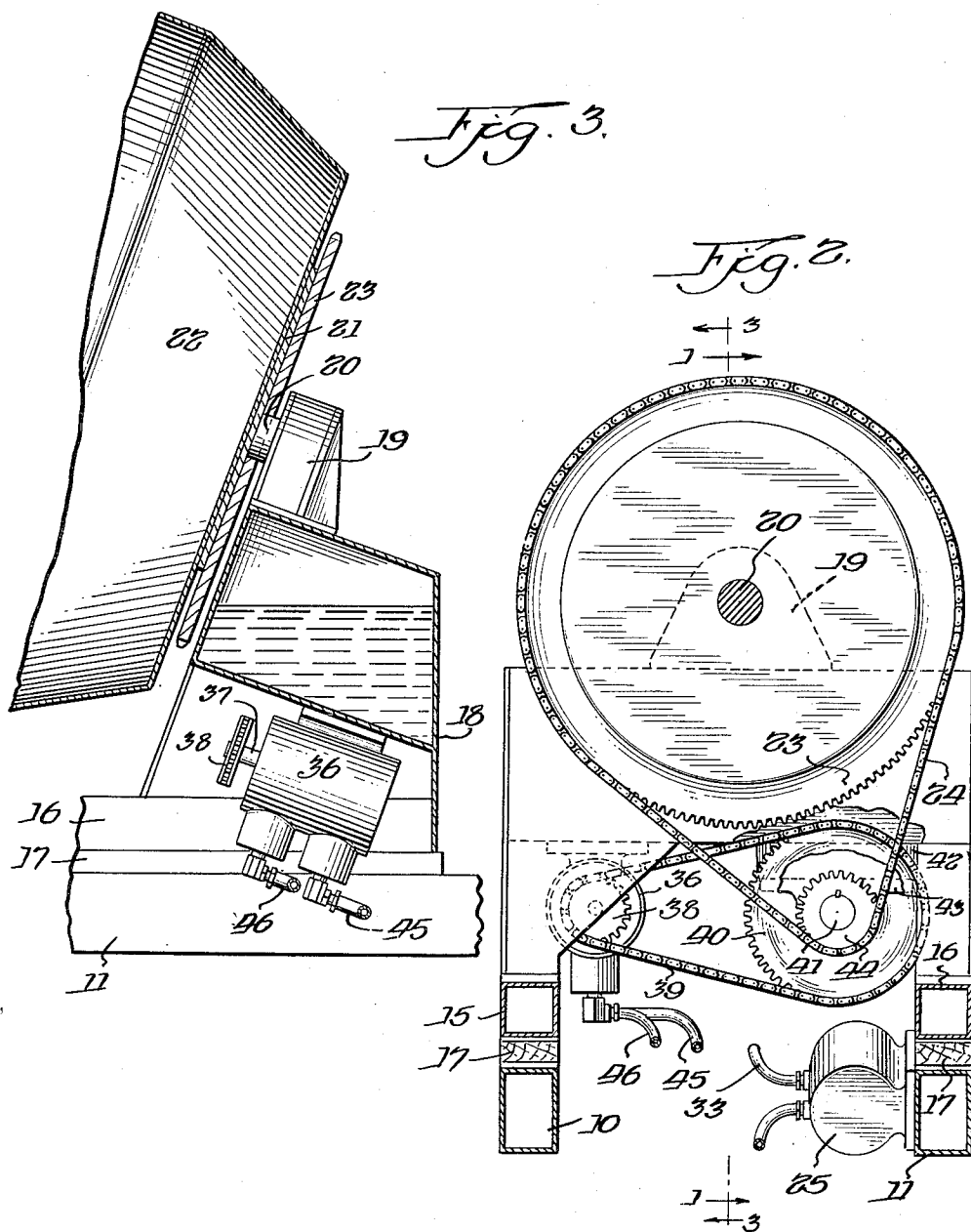
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UNITED STATES PATENT OFFICE

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POWER-TRANSMITTING MEANS FOR
TRANSIT CONCRETE MIXERSJohn Foster Oury, Melrose Park, Ill., assignor to
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copartnership

Application April 3, 1951, Serial No. 218,981

5 Claims. (Cl. 259—177)

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My invention relates to reversible power transmitting apparatus, and has particular reference to power transmitting apparatus for operation of a concrete mixing drum mounted upon by a truck chassis thereby producing a concrete transit mixer described and claimed in abandoned application Serial No. 213,774 filed March 3, 1951, of which I am a joint inventor.

The primary object of my invention is the provision of reversible power transmitting apparatus in which the source of power is the motor of the truck having a power take-off shaft from the transmission leading through a hydraulic pump which supplies power to a reversible hydraulic motor with mechanical connections therefrom to the concrete drum by means of which the drum may be rotated in either direction.

Another object of my invention is the provision of a power transmitting apparatus which is smooth and direct in operation and which does not impose an exceedingly heavy load quickly upon the motor of the truck so that it is apt to stall, and also applies power to the drum in a smooth accelerating fashion so that the drum is rotated easily and smoothly without the shocks incident to an ordinary mechanical connection with the motor of the truck.

Another and further object of my invention is the provision of power transmitting apparatus which is simple in operation and which can be disconnected in use so as not to impose a load on the truck motor to such an extent that it would be stalled, particularly when the truck is ascending a heavy grade or is engaged in pulling the truck up a heavy incline sufficient to utilize substantially all of the power of the truck motor.

I am aware that various types of mechanical take-off mechanisms from a truck motor has been employed for the purpose of operating a mixing drum mounted upon a truck, this apparatus has not proven satisfactory largely because of the shocks involved when the concrete drum is initially started to rotate, and also the truck driver is not able to utilize the power of his truck motor to the best advantage in these mechanical connections. This has led in many instances to the mounting of a separate motor for operating the concrete mixing drums, which practice has not been satisfactory from an upkeep standpoint, and from the necessity of maintenance of the motor and many other objections to this style of device.

Another and further object of my invention to the provision of apparatus which is simple in

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operation and which is not materially affected by weather or road conditions and which can easily and quickly be controlled by the operator at all times for both directions of rotation usually necessary for the changing of the drums, the mixing operation, and the discharge of the contents of the drum.

These and other objects of my invention will be more fully and better understood by the accompanying drawings in which:

Figure 1 is a view partially in elevation and partially in section of a portion of a truck and the front end of a mixing drum mounted thereon.

Figure 2 is a view partially in section and partially in elevation showing the various mechanical parts applied to the chassis of the truck and to the mixing drum.

Figure 3 is a sectional view on lines 3—3 of Figure 2 and

Figure 4 is a diagrammatic view showing the various operating parts of the power transmitting device.

Referring now specifically to the drawings and in which like characters refer to like parts throughout, sills 10 and 11 of a truck chassis are shown having the usual internal combustion motor 12 mounted thereon with the usual transmission 13 having a take-off shaft 14 connected with the transmission mechanism with the usual clutch mechanism under the control of an operator not shown but which is common with devices of this character and forms no part of the present invention.

Mounted upon the sills 10 and 11 of the truck is a tube frame having side members 15 and 16 which are mounted upon the sills 10 and 11 by blocks 17, 17, and form the foundation for a built up pillow block 18 which has a bearing 19 thereon at its top within which is journaled a shaft 20 secured to a plate 21 on the forward end of the mixing drum 22 with the shaft 20 forming an axle upon which the drum 22 rotates. A large sprocket wheel 23 is secured to the plate 21 and has a sprocket chain 24 mounted thereon which is connected with the power operating mechanism hereinafter described.

A hydraulic pump 25 is provided, preferably of the radial vane variety common in the field of pumps, which is mounted upon the side of the sill 11 and has a drive shaft 26 thereon which is connected at one of its ends to a connecting shaft 27 which is coupled in turn to the take-off shaft 14 connected with the transmission mechanism of the truck. The pillow block 18 has a separating wall 28 therein with a well 29

in the wall 28 which with the side walls of the pillow block forms a compartment 30 in the upper part of the pillow block 18 within which a hydraulic fluid 31 is carried for use in the power mechanism. A pipe 32 is connected with the separating wall 28 of the pillow block 18 and is connected at its other end to the pump 25 and provides means by which the hydraulic fluid 31 flows from the receptacle 30 to the pump 25. A pressure control and reducing device 34 is provided with an outlet pipe 33 leading thereto the pump 25 with a pipe 35 leading from the pressure control device 34 back to the receptacle 30 in the pillow block 18 which pipe 35 carries the hydraulic fluid 31 from the pressure control device 34 back to the receptacle 30 so that complete circulation of the hydraulic fluid may take place with the power device idling.

A hydraulic motor 36 is provided also of the radial vane variety having a motor shaft 37 extending therefrom with a sprocket wheel 38 mounted on the motor shaft 37 and which has a sprocket chain 39 thereon leading to a sprocket wheel 40 mounted upon a jack shaft 41 supported in brackets 42 and 43 which are secured to the bottom wall 28 of the pillow block with the sprocket wheel 40 being received into a well 29 formed in the wall bottom 28 of the receptacle 30 within the pillow block 18. At one end of the jack shaft 41, a sprocket wheel 44 is mounted which is connected with the sprocket chain 24 so that the rotative force of the motor 36 is transmitted through the sprocket wheels 38 and 40 and sprocket chains 39 and 24 to the drum 22. A sprocket connection is transmitted to the drum 22 supply pipes. The motor 36 has supply pipes 45 and 46 connected thereto which lead to a four way valve 47 of the usual form and which has an operating handle 48 connected therewith by means of which the four way valve is controlled by the operator. A pipe 49 is provided which is connected with the pipe 33 at one of its ends and to the valve 47 at its opposite end while at the opposite side of the four way valve 47, a pipe 50 is provided which is connected with the return pipe 35 leading to the receptacle 30 by means of which the hydraulic fluid 31 is circulated back into the tank 30 during the operation of the apparatus and after the fluid has passed through the four way valve 47 or the pressure control device 34.

In operation the structure is comparatively simple in that when the four way valve 47 is under the direct control of the operator or may have suitable operating connections to the handle 48 leading to some convenient location in the truck, whereby the hydraulic fluid is admitted to the valve 47 through the pipe 49 from the pipe 33. When the pump 25 is in operation with the handle 48 in vertical position the four way valve 47 is closed and the hydraulic fluid under pressure from the pump 35 passes from the pump 33 into the pressure regulating device 34 where its pressure is reduced and it flows back into the receptacle 30. When the handle 48 of the valve 47 is moved to the left as shown in dotted position of Fig. 4, the ports in the valve 47 are opened so that fluid under pressure flows through the pipe 49 into the pipe 45 to the motor 36 causing the motor 36 to rotate in one direction, and for purposes of illustration, power is conveyed to the drum 22 to rotate in a clockwise direction as seen by the operator standing at the rear of the truck for the charging operation of the drum and also for the mixing opera-

tions. As the drum is rotated in this direction, the fluid passes from the motor 36 into the pipe 46 back through the valve 47 and which, when the handle is in the position as hereinabove described, opens ports in the valve 47 so that the fluid flows through the valve 47 from the pipe 46 into the pipe 50, and to the return pipe 35 thus completing a cycle of operation of the fluid during the charging and mixing operation of the drum.

When it is desired to reverse the direction of travel of the drum 22 for the discharge operation, the handle 48 is moved into the right hand position as shown in the dotted lines of Fig. 4, whereupon the hydraulic fluid coming from the pipe 33 enters the valve 47 through the pipe 49 and passes into the motor 36 through the pipe 46 through the motor 36 into the pipe 45 and back to the valve 47. When the valve handle 48 is in the right hand position, the ports in the valve 47 leading from the pipe 45 is connected with the outlet pipe 50 so that the fluid flows into the return pipe 35 and back into the receptacle 30 forming a part of the pillow block 18 thereby. The motor 36 operating in a reverse direction from that described for the charging and mixing operation, rotates the drum 22 in a counterclockwise direction which discharges the contents therefrom out of the open end of the drum 22 the operation of which is described in detail in abandoned application hereinabove identified.

From the foregoing description, the operation of the device is constantly under the control of the operator. When the operator connects the power take-off shaft 14 with the gear transmission, the pump 25 commences to function building up a pressure to the control device 34 where, with the valve 47 closed, the pressure is reduced and the fluid returns through the pipe 35 to the receptacle 30. With the valve handle 48 of the four way valve 47 in vertical position, the pump 35 will operate placing the hydraulic fluid passing therefrom pressure usually approximately 2,000 pounds per square inch, to the pressure reduction device 34 where the pressure is reduced to substantially no pressure or to a very low pressure, whereupon the fluid flows back into the receptacle 30. When the operator wishes to rotate the drum he moves the handle 48 of the four way valve to the left hand position which results in the material in the drum being mixed and retained in the drum during its charging and mixing operation to a sufficient extent desired, and when the mixing is completed, the operator can stop the rotation movement of the drum 22 by moving the lever 48 back to a vertical position. If the motor of his truck is being subjected to a very severe strain, he disconnects the take-off shaft 14 from the transmission mechanism so that the entire power of his motor can be directed to the tract or effort of the truck itself. This load would normally continue only for a short time and by resetting the mechanism as described above, the mixing can be and may be continued in operation while the truck is standing still with the truck motor in operation, but disconnected from the transmission mechanism leading to the wheels of the truck. When it is desired to discharge the lading of the drum 22, then the operator moves the handle into the right hand position as shown in Fig. 4 where as hereunder described the drum 22 is rotated in a counterclockwise direction and the lading discharged from the drum in a continuous opera-

tion, or the discharging operation may be performed in a number of small operations by moving the handle 43 into a vertical or right hand position subject to the will of the operator. This operation is continued until the entire lading of the drum is discharged therefrom.

While I have described more or less precisely the details of construction, I do not wish to be understood as limiting myself thereto, as I contemplate changes in form and the proportion of parts and the substitution of equivalents as circumstances may suggest or render expedient without departing from the spirit or scope of the appended claims.

What is claimed is:

1. In combination with a motor driven truck, a concrete mixing drum mounted in the said truck, a power take-off shaft from the operating motor of the said truck, a combined pillow block and supply tank for hydraulic fluid, a hydraulic pump driven by said power take-off shaft a conduit from the said tank to the pump, a pressure regulating device, an outlet conduit from the said pump to said pressure regulating device, a return conduit from the pressure regulating device to the said tank, a two way hydraulic motor, a four way valve having an inlet conduit connected to the conduit leading from the pump to the pressure regulating device, and having an outlet conduit leading therefrom to the return conduit from the pressure regulating device to the said tank, a pair of conduits leading from the four way valve to the said motor whereby fluid under pressure may be selectively admitted to either of said conduits leading from the valve to the motor, the other conduit providing means whereby the fluid returns from the motor through the four way valve to the return conduit to the tank, a jack shaft mounted in the said pillow block, sprocket wheels thereon, a sprocket chain from the said motor to one of said sprockets on the jack shaft, and a sprocket chain from the other of said sprockets to the said drum.

2. In combination with a motor driven truck, a concrete mixing drum mounted on the said truck, a power take-off shaft from the operating motor of the said truck, a combined pillow block and supply tank for hydraulic fluid, a hydraulic pump driven by said power take-off shaft, a conduit from the said tank to the pump, a pressure regulating device, an outlet conduit from the said pump to said pressure regulating device, a return conduit from the pressure regulating device to the said tank, a two way hydraulic motor, a four way valve having an inlet conduit connected to the conduit leading from the pump to the pressure regulating device, and having an outlet conduit leading therefrom to the return conduit from the pressure regulating device to the said tank, a pair of conduits leading from the four way valve to the said motor whereby fluid under pressure may be selectively admitted to either of said conduits leading from the valve to the motor, the other conduit providing means whereby the fluid returns from the motor through the four way valve to the return conduit to the tank, a jack shaft mounted in the said pillow block, sprocket wheels thereon, a sprocket chain from the said motor

to one of said sprockets on the jack shaft, and a sprocket chain from the other of said sprockets to a sprocket wheel on the said drum.

3. A transit mixer comprising in combination a motor vehicle, a concrete mixing drum, a combined pillow block and hydraulic fluid receptacle the pillow block supporting one end of a mixing drum, a hydraulic motor mounted on the said pillow block, a transmission shaft on the said pillow block, sprocket wheels on the said shaft, sprocket chains on the said sprocket wheels, a sprocket wheel on the mixing drum, the said sprocket chains connecting the sprocket wheels on the transmission shaft with the said motor and the sprocket wheel on the said drum, and a source of hydraulic fluid under pressure whereby the said motor is operated.

4. A transit mixer comprising in combination a motor vehicle, a concrete mixing drum, a pillow block having a transverse wall therein whereby a hydraulic receptacle is formed within said pillow block, a hydraulic motor mounted on the said pillow block, a transmission shaft on the said pillow block, sprocket wheels on the said shaft, sprocket chains on the said sprocket wheels, a sprocket wheel on the mixing drum, the said sprocket chains connecting the sprocket wheels in the transmission shaft with the said motor and the sprocket wheel on the said drum, and a source of hydraulic fluid under pressure whereby the said motor is operated.

5. In combination with a motor driven truck, a concrete mixing drum mounted on said truck, a power take-off shaft from the operating motor of said truck, a pillow block for the drum including means defining a supply tank for hydraulic fluid, a hydraulic pump driven from said power take-off shaft, a conduit from said tank to the pump, a pressure regulating device, an outlet conduit connecting said pump to said pressure regulating device, a fluid return conduit from the pressure regulating device to said tank, a hydraulic motor adapted to be driven in forward and reverse directions by fluid from the pump, valve means having an inlet connected to said outlet conduit and having an outlet connected to said return fluid conduit, said valve means including a pair of valve controlled ports, conduit means respectively connecting said valve controlled ports to the motor, whereby fluid under pressure from the pump may be selectively directed through said valve means to either of said last mentioned conduit means for delivery to the motor with the other of said conduit means providing means whereby the fluid may return from the motor through said valve means to said return fluid conduit to the tank and power transmission means from said motor to the concrete drum.

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