A. KUEFER.

AUTOPLOW.

APPLICATION FILED NOV. 23, 1914.

1,225,339.

Patented May 8, 1917.

5 SHEETS—SHEET 1.

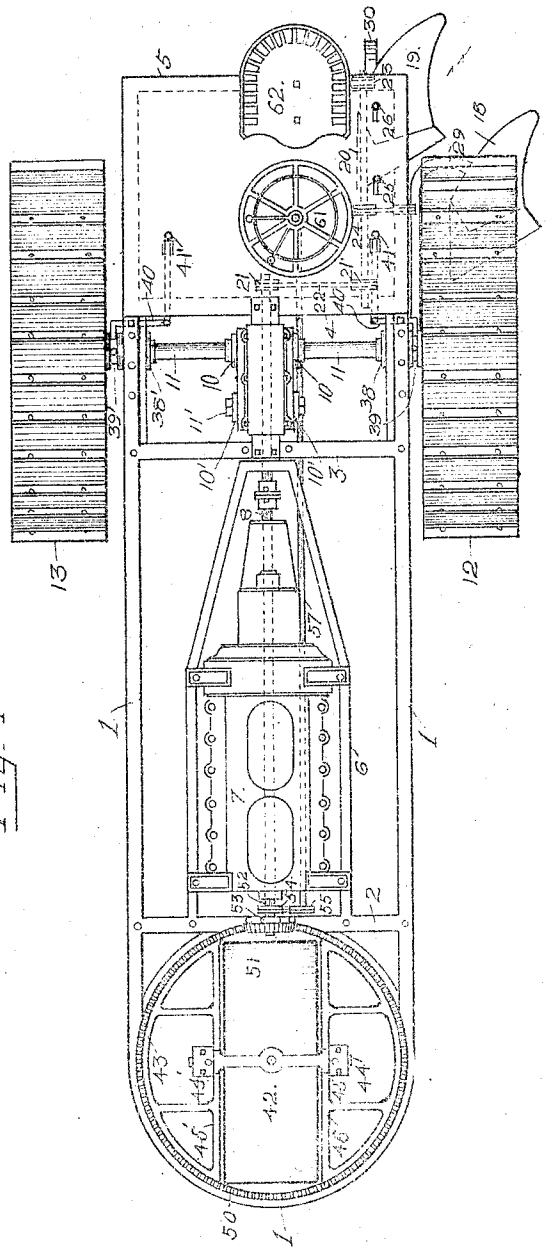


Fig. 1

Witnesses—
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Frederick A. Richm

Inventor:
Anthony Kuefer
By Richard D. Watson
His Attorney

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5 SHEETS—SHEET 2.

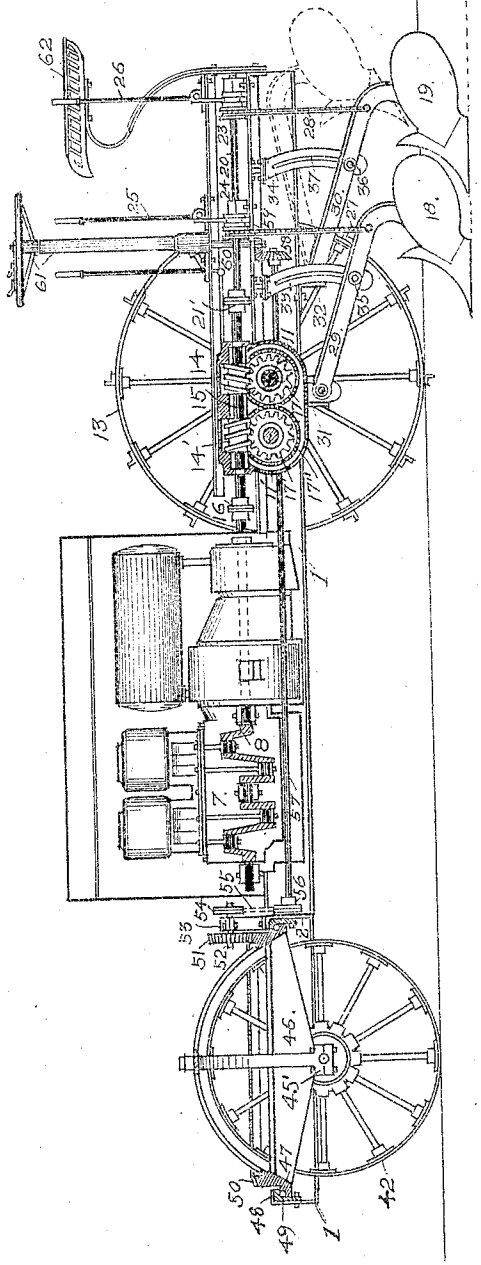


Fig. 2

Witnesses.

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5 SHEETS—SHEET 3.

Fig. 4

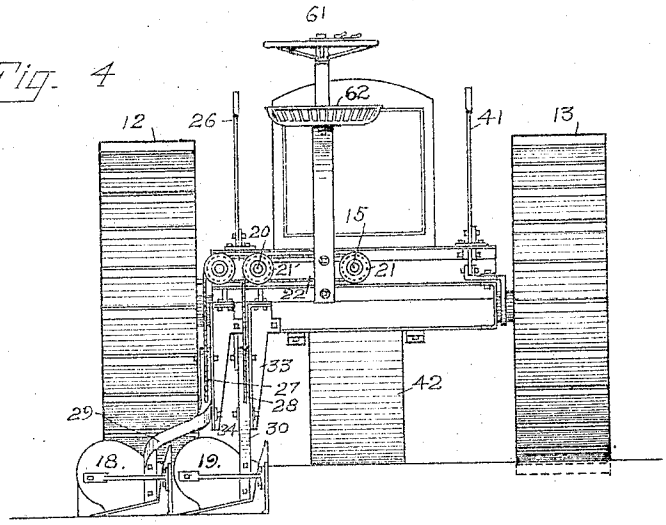
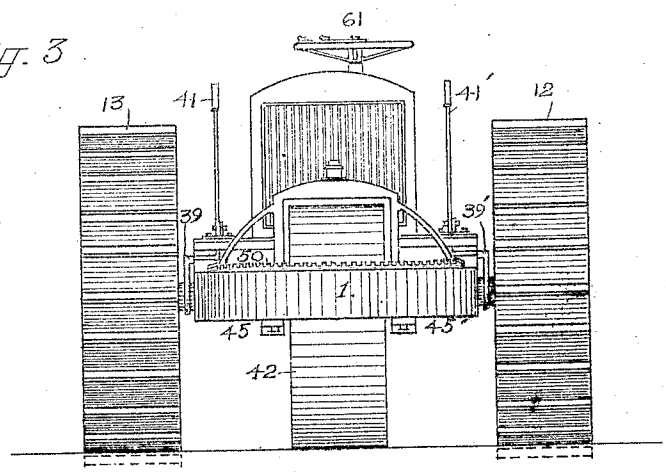


Fig. 3



Witnesses—
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5 SHEETS—SHEET 4.

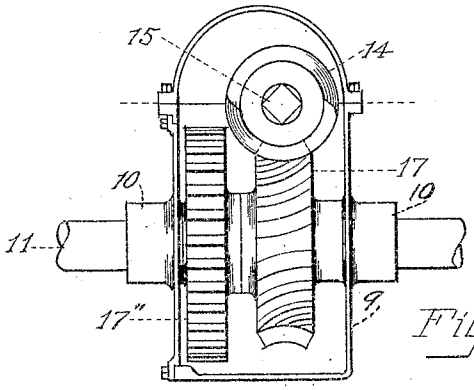


Fig. 6

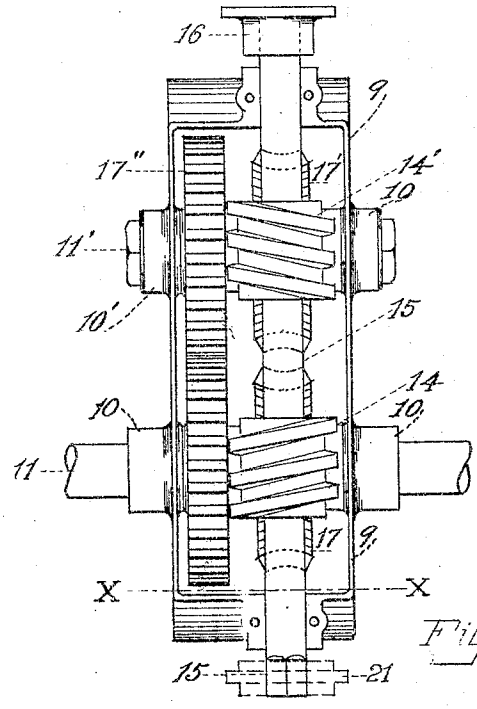


Fig. 5

Witnesses.

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5 SHEETS—SHEET 5.

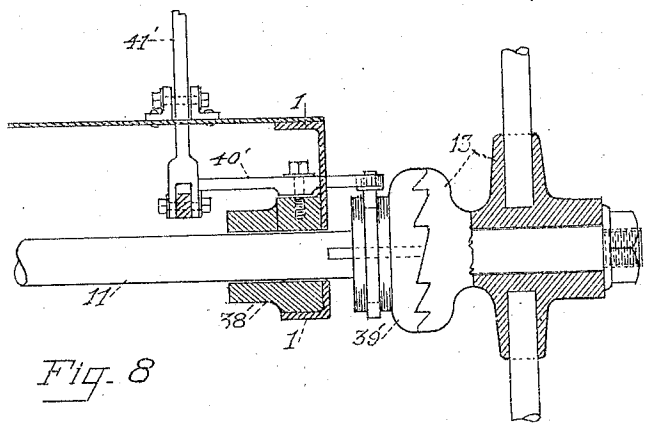


Fig. 8

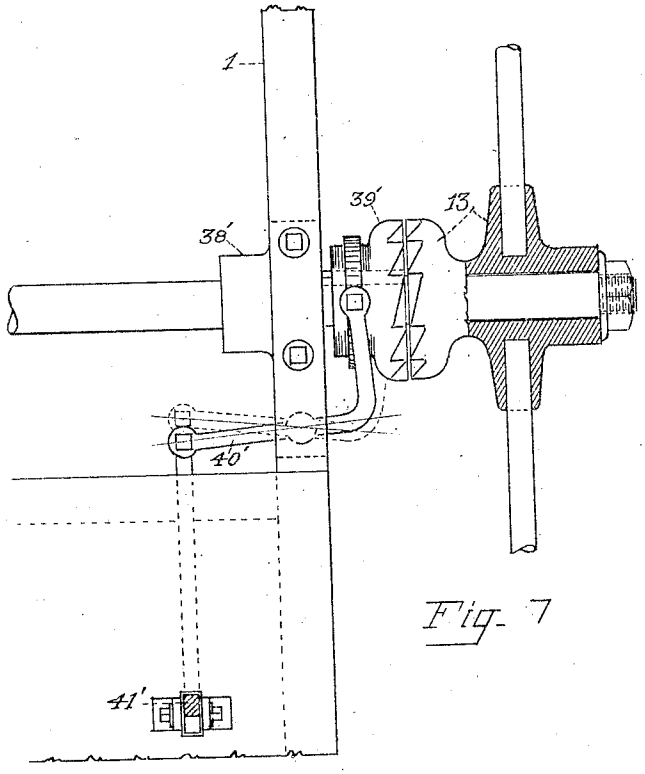


Fig. 7

Witnesses—
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Inventor—
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Richard D. Watson
His Attorney

UNITED STATES PATENT OFFICE.

ANTHONY KUEFER, OF TOLEDO, OHIO, ASSIGNOR TO ROBERT B. WILSON, TRUSTEE, OF TOLEDO, OHIO.

AUTOPLOW.

1,225,339. Specification of Letters Patent. Patented May 8, 1917.

Application filed November 23, 1914. Serial No. 873,520.

To all whom it may concern:

Be it known that I, ANTHONY KUEFER, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented new and useful Improvements in Autoplows, of which the following is a specification.

My invention relates to improvements in auto plows, and has for its object to provide an auto plow with improved means of transmitting the power of the motor to the traction wheels, whereby less power of the motor is expended in propelling the tractor itself, and increased power is utilized to draw its load.

A further object is to provide the tractor with improved means of steering and turning, whereby its turning is effected substantially within its own length, by its own power, and the manual labor of steering is greatly reduced.

I accomplish these objects by the construction and combination of parts, hereinafter described and illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of entire device.

Fig. 2 is a side view.

Fig. 3 is a front view.

Fig. 4 is a rear view.

Fig. 5 is an enlarged plan view of the mechanism for rotating the main axle contained in the casing therefor shown in Fig. 1, with the top of the casing removed.

Fig. 6 is a cross section of the same on line *x*—*x* of Fig. 5.

Fig. 7 is a plan view, partly in section, of an enlarged broken away portion of the main frame and of the main axle and one traction wheel, and showing the clutch mechanism controlling the traction wheel enlarged, and

Fig. 8 is an elevation of the same partly in section.

Similar numerals refer to similar parts throughout the several views.

1 is semi-circular front and parallel sides of the main frame, having cross members 2, 3, 4 and 5; 6 is a frame secured to 2 and 3, in which is mounted the motor 7, with its crank shaft 8 central to and parallel with the sides of the main frame 1. 9 designates a gear casing mounted on cross members 3 and 4 in line with the shaft 8.

The means to rotate the main axle 11 and traction wheels 12—13 comprises a pair of worms, one of said worms being right and the other left hand threaded worms 14—14′ fixedly mounted on shaft 15 which is coupled by coupling 16 to the crank shaft 8 of the motor 7. The worm 14 intermeshes with a worm gear 17 rigidly mounted on the main axle 11, and the opposite worm 14′ in like manner intermeshes with the worm gear 17′ on the auxiliary shaft 11′, suitably journaled in bearings 10′ of the gear casing 9, parallel with the axle 11, which is also journaled in bearings 10 of the casing. The axle 11 and shaft 11′ are connected to each other by intermeshing gears 17″ rigidly mounted one on the axle 11 and one on the shaft 11′.

Thus constructed and connected the parts constitute a worm drive wherein the end thrust of each worm is balanced and neutralized by the opposed end thrust of the other, and the two equal worms jointly and equally transmit the full power of the worm shaft, free from any end thrust friction, to two equal worm gears and through the worm gears to the axle 11 and the shaft 11′ revolved at equal speeds, which being connected by two equal intermeshing gears, constitutes the whole, a single, balanced unit drive, wherein the load on the axle 11 is equally borne by said axle 11 and the shaft 11′, and whereby the use of end thrust bearings for the worm shaft, as well as the highly detrimental friction and wear incident thereto, is wholly avoided without materially creating other friction, and the wear is so distributed among the parts that the life of the whole is greatly prolonged.

However the means to rotate the main axle 11 and the traction wheels 12—13 as herein shown and described, constitute a separate and distinct invention that is applicable as a power transmission wherever it is necessary to transmit the rotary motion of a driving shaft to a driven shaft that is transverse the line of the driving shaft, and I therefore, while adopting it for use in my present invention, do not limit myself to its use in the plow tractor herein described, and I hereby declare my intention to make it the subject of a separate application wherein its novelty and utility as a power transmission will be set forth and broadly claimed.

By adapting and employing my above described drive to my present invention, I thereby greatly reduce the power expended

in propelling the plow tractor itself, whereby an increased percentage of the power of the motor is made available to draw the plows.

The means to lift and lower the plows 18—19 comprises the shaft 20 which is connected to the shaft 15 by sprockets 21—21′ and chain 22; on the shaft 20 are the clutched sprockets 23—24 and are adapted to raise the plows when the sprockets are clutched and to unwind and drop the plows when the sprockets are unclutched. The plow beams are pivoted to brackets 31—32 which are secured to the main frame 1. The plow beams are stayed from lateral motion by the slotted radial arms 33—34 which are secured to the frame 1.

The studs 35 and 36 pass loosely through the slots 37 and are rigidly secured in the plow beams 29—30. The main axle 11 is mounted to revolve in bearings 38—38′ which are secured to the frame 1. The tractor wheels 12—13 mounted on axle 11 are adapted to engagement with clutches 39—39′. Said clutches are operated by bell cranks 40—40′ in connection with levers 41—41′. By this construction means are provided for differential movement of the traction wheels in steering and turning.

The front carrier wheel 42 is adapted also as a steering wheel by being mounted to revolve in an annular frame 43 on its axle 44 in the bearings 45—45′ secured to the cross members 46—46′ of the frame 43. The under portion 47 of the frame 43 forms the lower half of an annular ball race. The upper half 48 of the ball race being secured to the circular portion and cross-member 2 of the frame 1, with the balls 49 located between and keeping separate the lower and upper halves 47 and 48 of the ball race, which form the annular ball bearing of the annular frame 43; as means to horizontally rotate the carrier frame 43, it has an annular gear 50 formed on its upper face which intermeshes with a gear wheel 51 that is mounted on a shaft 52 which is mounted to revolve in a bearing 53, which is secured to the cross member 2 of the main frame. On the opposite end of shaft 52 is rigidly secured the sprocket 54, that is connected by the chain 55 to the sprocket 56 which is mounted on the forward end of the shaft 57, on the opposite end of which is rigidly mounted the bevel gear 58, intermeshing bevel gear 59 which is rigidly mounted on shaft 60 forming an extension of the steering wheel column 61 by which the steering in controlled by the operator occupying seat 62 convenient to the operating levers.

What I claim to be new is—

1. The combination in a tractor, a main frame, a main and a secondary axle spaced parallel and journaled transverse the main frame, a pair of intermeshing duplicate gears, one rigidly fixed on each of said axles, a pair of opposed worm wheels spaced and rigidly fixed one on each of said axles, a worm shaft spaced and journaled transverse the main and secondary axles, a pair of opposed worms spaced and rigidly fixed on the worm shaft and intermeshing the worm wheels on the main and secondary axles, means to rotate and reverse the rotation of the worm shaft, a pair of tractor wheels revolubly mounted on the main axle, a pair of clutches, one to each tractor wheel, adapted to clutch or unclutch the said wheels in relation to the main axle, means to simultaneously or separately operate said clutches, an annular frame secured to the main frame and adapted to rotate horizontally, a steering wheel revolubly mounted in the annular frame and means to rotate the annular frame.

2. The combination in a plow tractor, of a main frame, a main driving axle journaled transverse the main frame, a secondary axle parallel with the main axle in the same horizontal plane, a pair of intermeshing duplicate gears, one fixedly mounted on the main axle, and the other on the secondary axle, a pair of worm wheels, one having teeth oppositely pitched to the teeth of the other, one of said worm wheels being fixedly mounted on the main axle, and the other on the secondary axle in the same vertical plane, each in fixed relation with the companion duplicate gear, a worm shaft journaled transverse the main and secondary axles in the vertical plane of the worm wheels, a pair of worms fixedly mounted on the worm shaft, and intermeshing respectively the worm wheels of the main and secondary axles, a pair of tractor wheels revolubly mounted on the main axle, each having the inner end of its hub adapted as a clutch member, a companion clutch member for each traction wheel slidably mounted on the main axle, and means to manually operate the companion clutch members to each engage or disengage its respective traction wheel.

In testimony whereof I have hereunto set my hand at Toledo, Ohio, this 21st day of November, 1914, in the presence of two subscribing witnesses.

ANTHONY KUEFER.

In presence of—
GEORGE W. GAGHAN,
FREDERICK A. RIEHM.