

L. L. DUBOIS.
TRACTOR.

APPLICATION FILED JUNE 29, 1920.

1,398,683.

Patented Nov. 29, 1921.

8 SHEETS—SHEET 1.

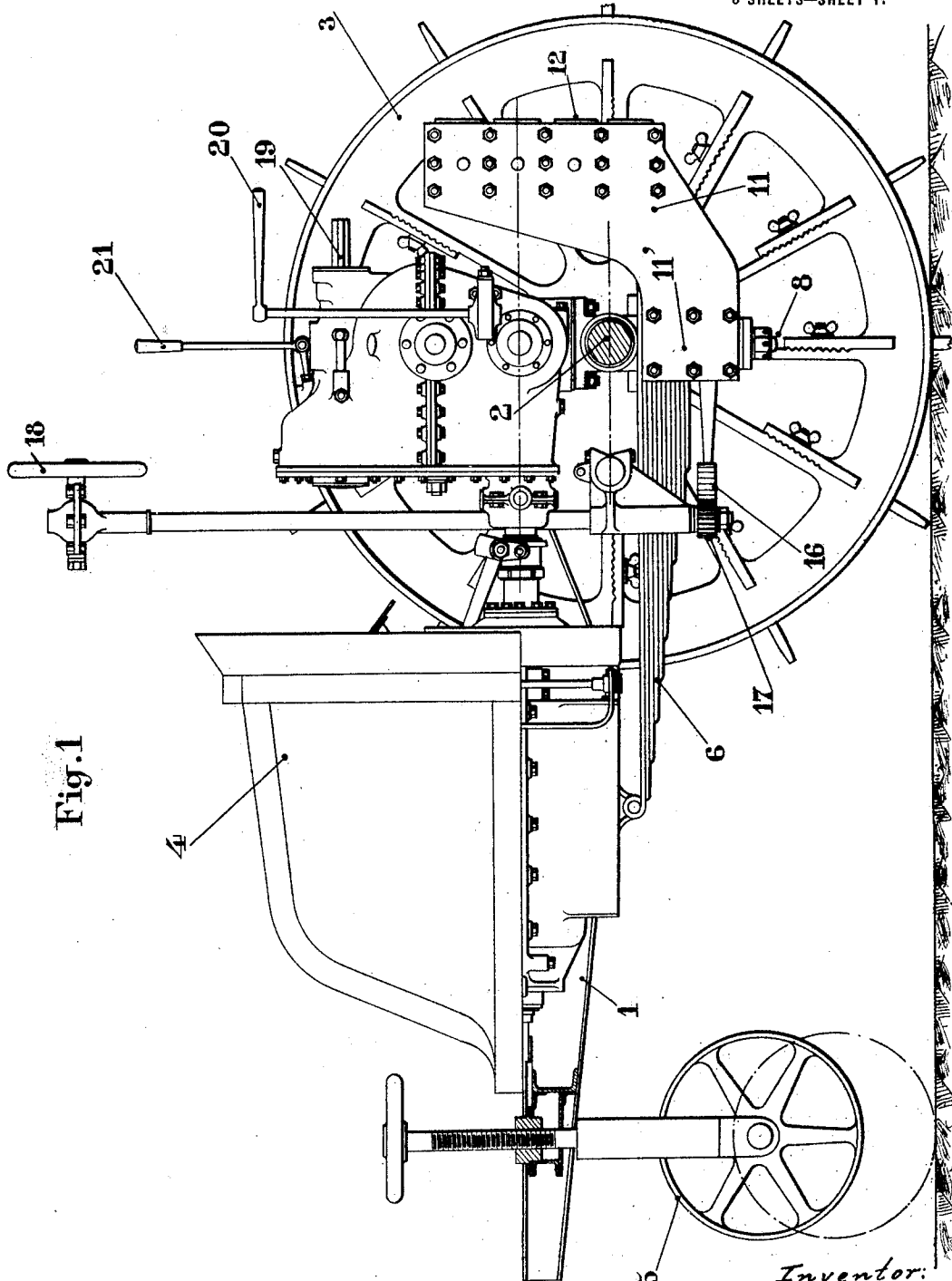


Fig. 1

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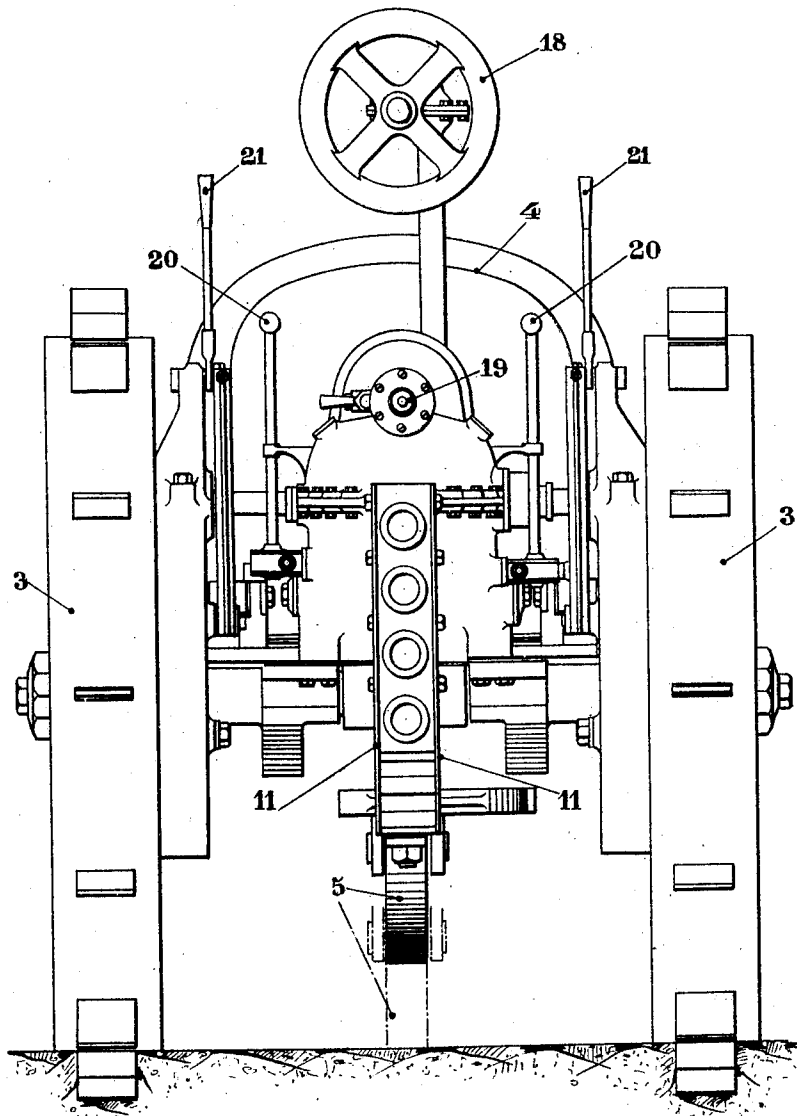
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8 SHEETS—SHEET 2.

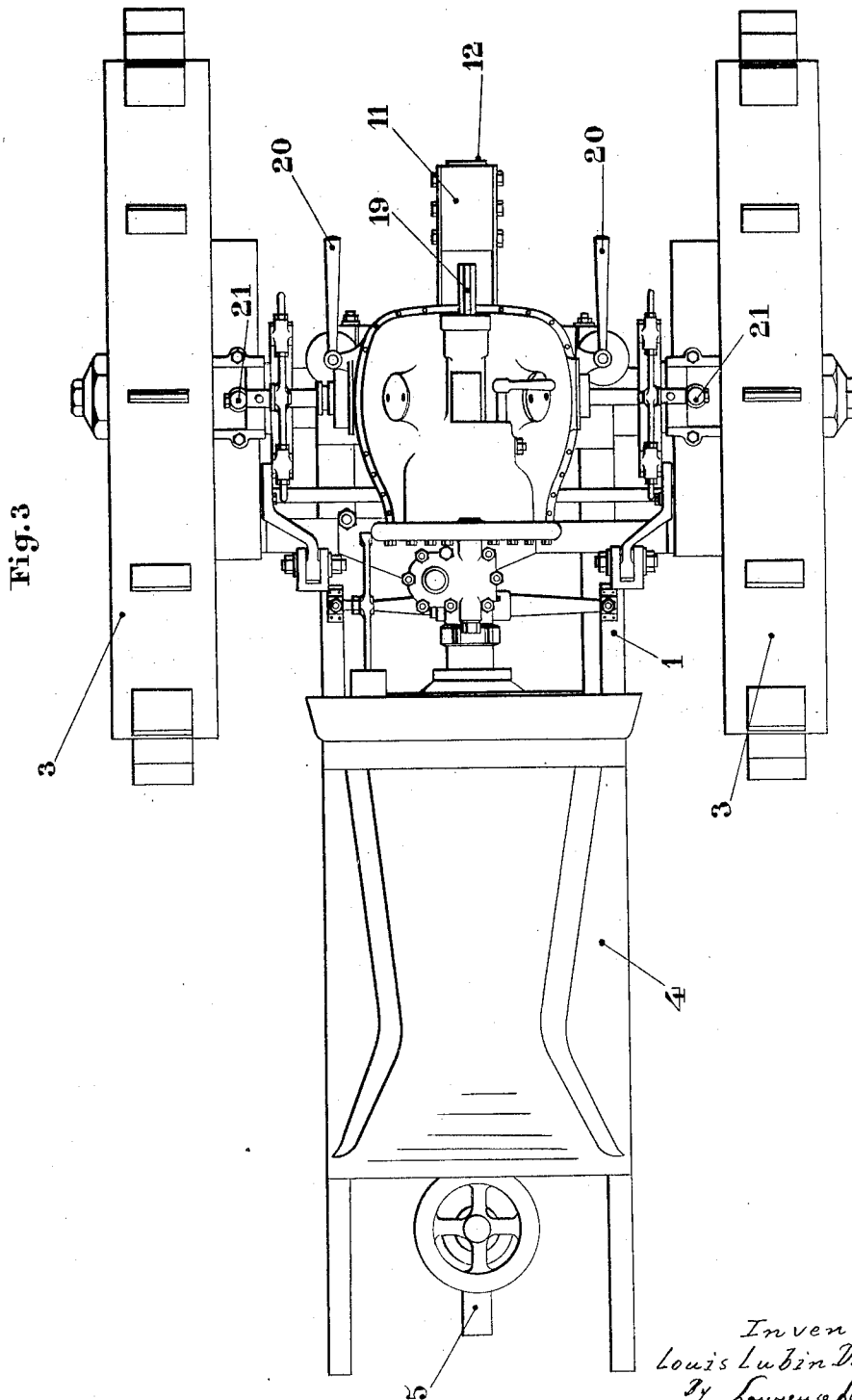
Fig. 2



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8 SHEETS—SHEET 3.



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Fig. 4

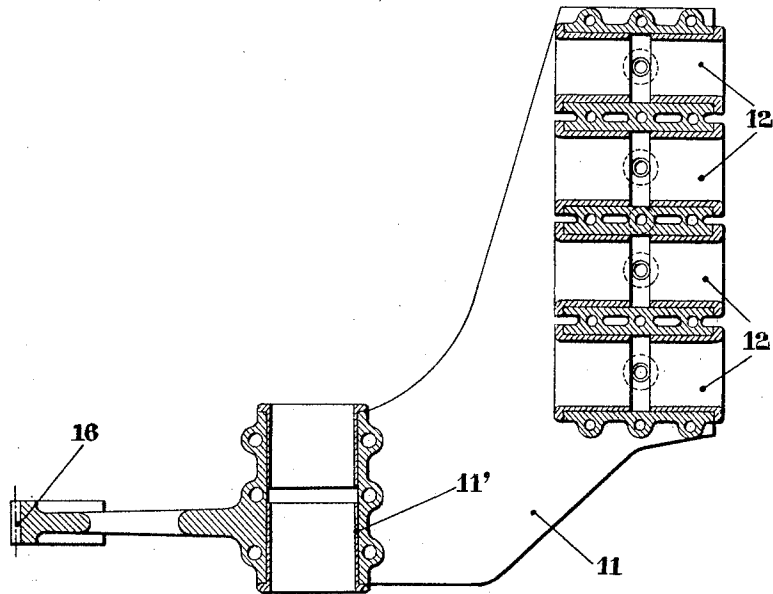
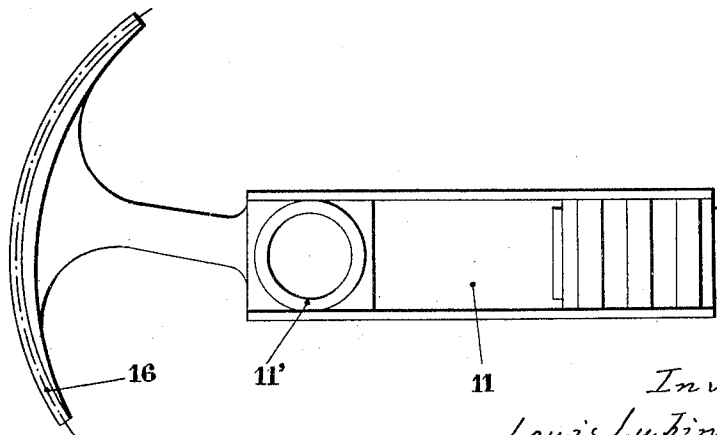


Fig. 5



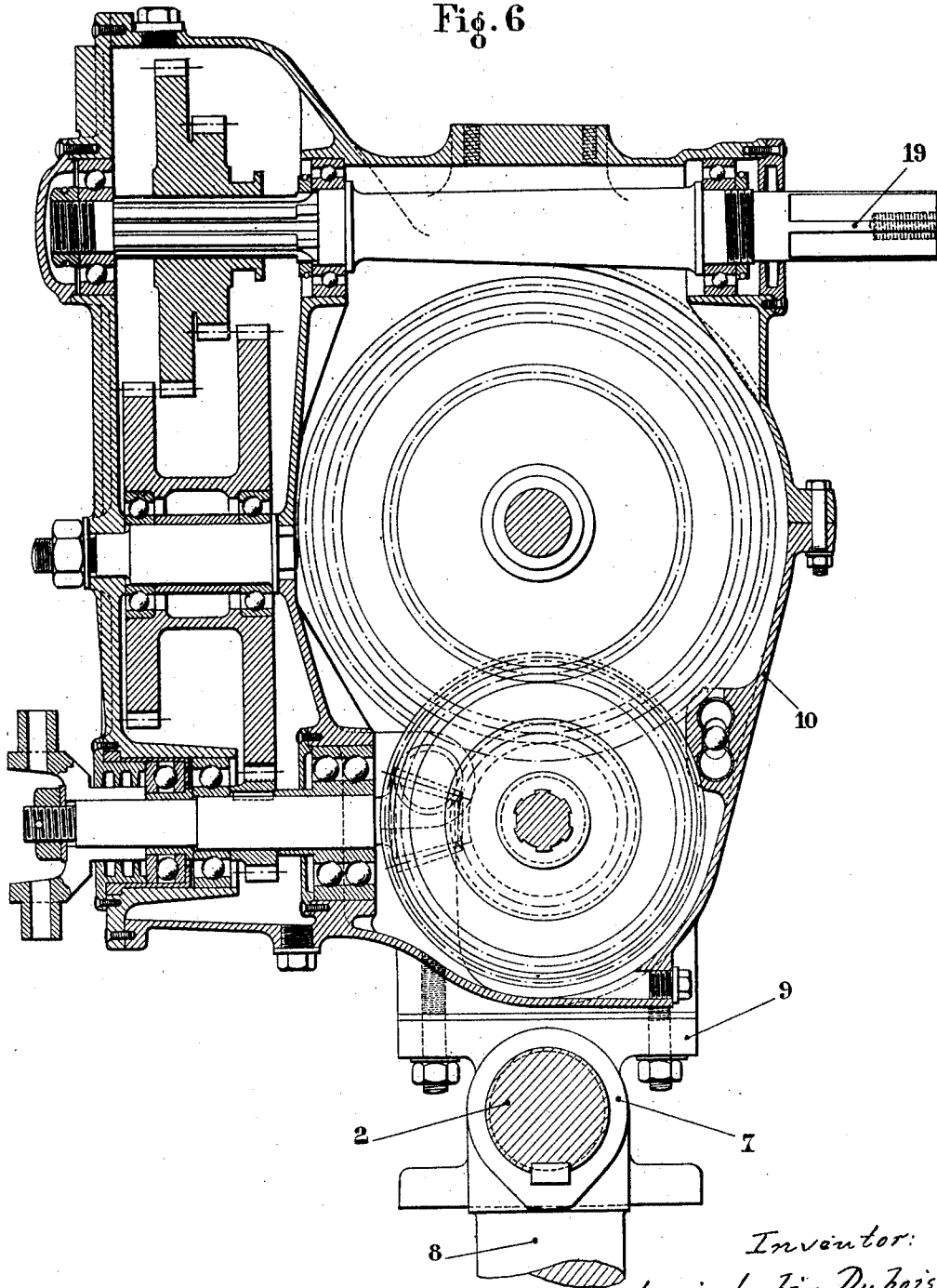
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8 SHEETS—SHEET 5.

Fig. 6

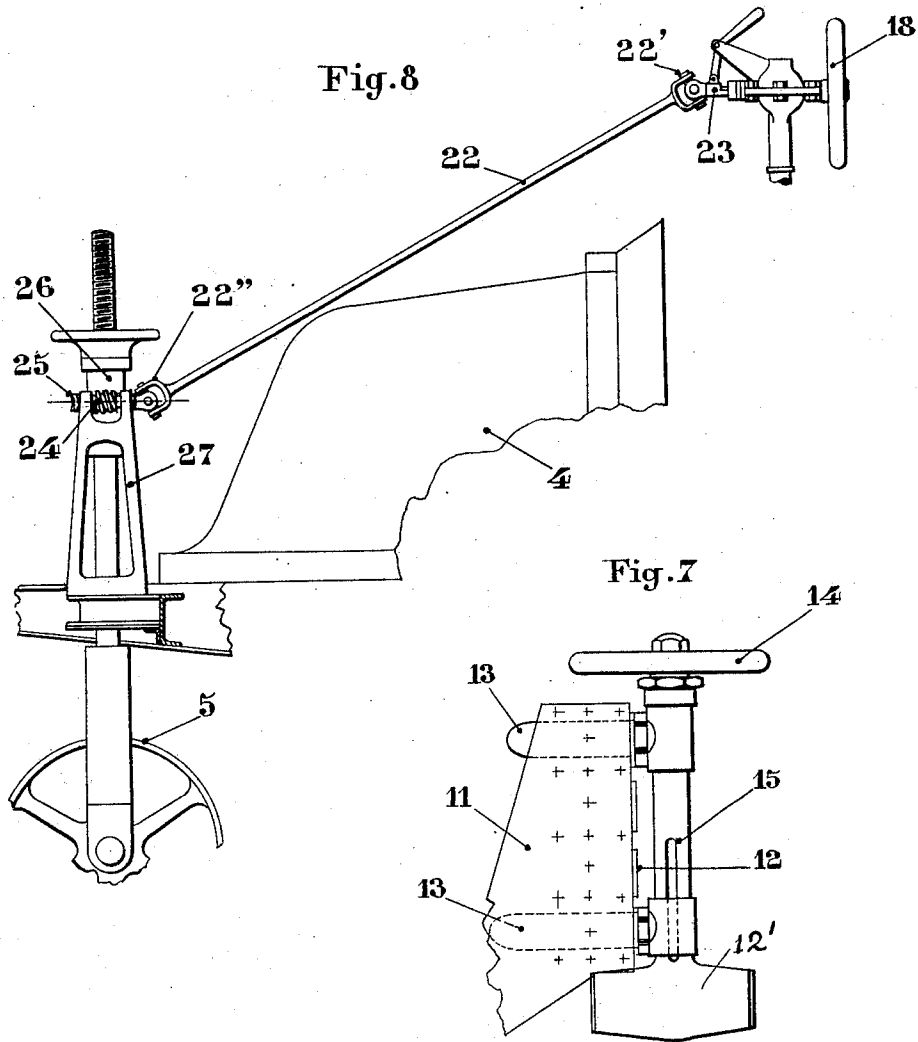


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8 SHEETS—SHEET 6.



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Fig.9

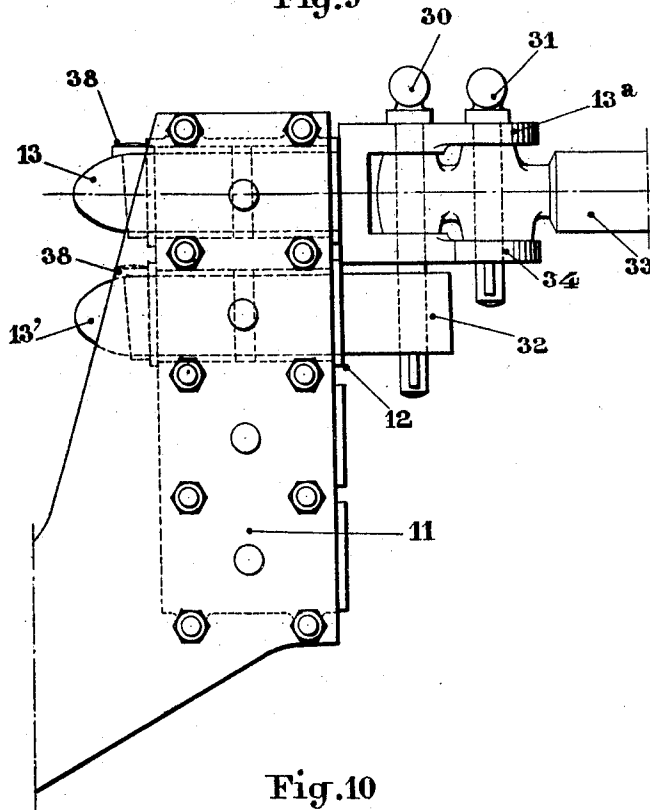
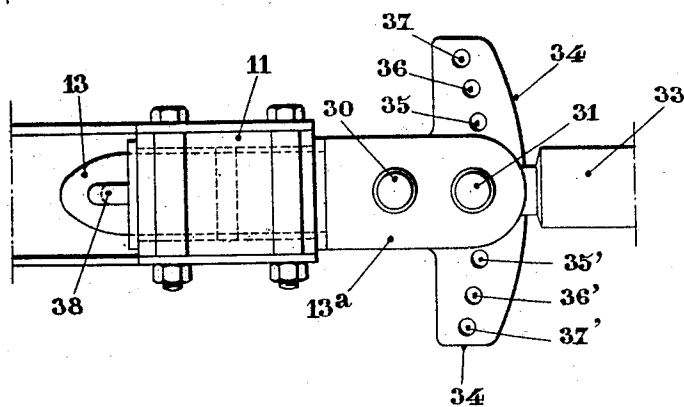


Fig.10



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8 SHEETS—SHEET 8.

Fig.11

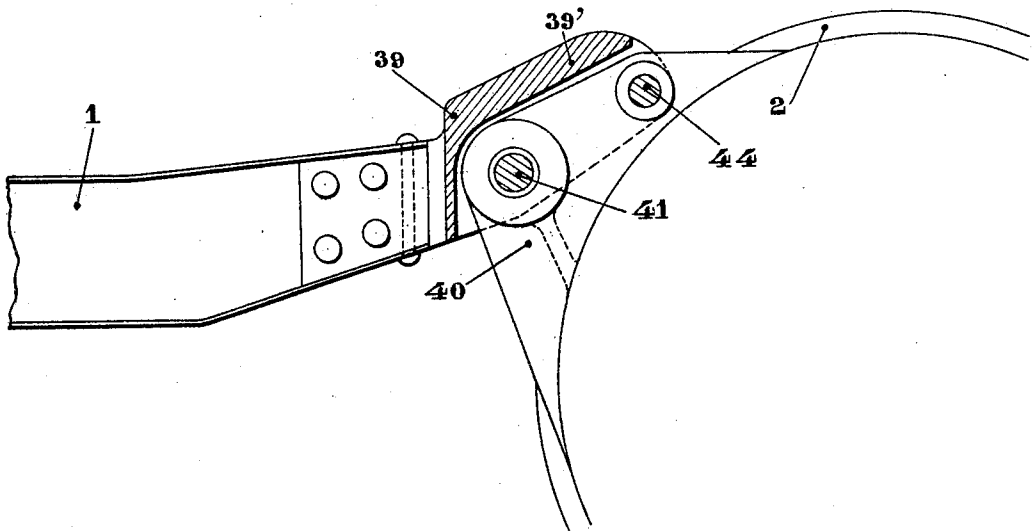
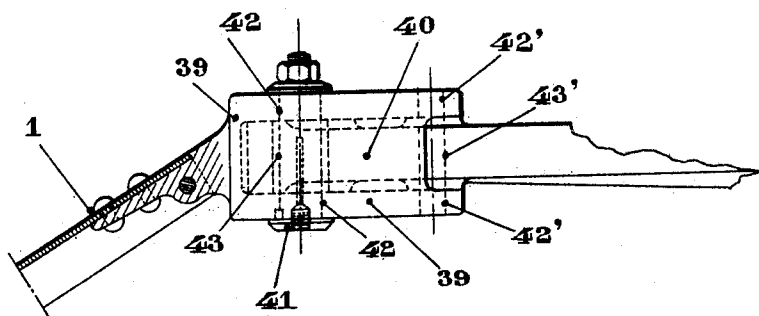


Fig.12



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UNITED STATES PATENT OFFICE.

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TRACTOR.

1,398,683.

Specification of Letters Patent.

Patented Nov. 29, 1921.

Application filed June 29, 1920. Serial No. 392,793.

To all whom it may concern:

Be it known that I, LOUIS LUBIN DUBOIS, a citizen of the French Republic, resident of 29 Rue de l'Avenir, Asnières, Seine, France, have invented new and useful Improvements in a Tractor, (for which I have filed applications in France, No. 109,092, 22nd February, 1919, and No. 13,162, of 21st May, 1920, patent of addition,) of which the following is a specification.

This invention relates to tractors, particularly for agricultural implements. The object of the present invention is to provide an improved tractor for both motive and tractive purposes of all kinds. This tractor is essentially characterized by its general organization, specially designed to make it a simple and durable appliance capable of being quickly coupled to an agricultural machine of any kind, so as to transform it into an automobile unit. The invention is also characterized by the peculiar arrangement of the steering mechanism, by a special coupling cross-piece, in combination with the tractor, finally by the change speed mechanism in which known devices have been combined in a new manner to adapt them to the particular purpose in view.

In the accompanying drawings a mode of construction of the tractor and a modification are represented by way of example.

Figure 1 is a side elevation view of the appliance, the driving wheel on the side of the observer being removed to show the parts more clearly.

Figs. 2 and 3 are, respectively, an elevation and a plan view.

Figs. 4 and 5, represent, on a larger scale, in elevation and in a plan view, the coupling cross-piece.

Fig. 6 is a section of the change speed gear box through a vertical plane parallel to the longitudinal axis of the tractor also on a larger scale.

Fig. 7 shows a special device for mounting on plows or other agricultural machines requiring accurate regulation in height.

Fig. 8 represents a device for utilizing the front wheel as a steering wheel.

Fig. 9 is a side elevation view of a modified form of the coupling device.

Fig. 10 is a plan view of Fig. 9.

Fig. 11 is a side elevation showing the pivotal connection of the rear end of one of the longitudinal beams of the chassis with the axle of the driving wheels.

Finally Fig. 12 is a plan view of Fig. 11.

As represented more particularly in Figs. 1 and 3, the tractor comprises a chassis 1 the longitudinal beams of which are each attached at the rear end to a boss on the axle 2 of the driving wheels 3. The said beams are extended forward at their front ends and supported by two springs 6 fixed on the axle 2. On the fore-part of the longitudinal beams a small wheel 5 is mounted which, during work, viz. when the tractor is coupled, is raised and occupies the position indicated in unbroken lines on Fig. 1. This wheel can be lowered by any suitable mechanism when the tractor is uncoupled, so that the appliance rests on three wheels (3 and 5), the chassis remaining horizontal. The wheel 5 is brought into the position shown in broken lines in Fig. 1 either in the operation of uncoupling a machine or vehicle, and coupling another, or when the tractor is traveling alone like a tractor with three ordinary wheels.

It is to be noted that when wheel 5 is lowered to the ground and no plowing machine is coupled to the tractor, a part of the total weight is supported by the wheel 5. In this case, the springs 6 no longer work normally, and, owing to the pivotal connection of the chassis 1, the appliance tends, in a sense, to break, the parts fixed on the axle and those on the chassis forming a more or less great angle with each other. This inconvenience is avoided by constituting the extremity of each longitudinal beam with a fork 39 provided with a top part 39' against the underside of which a boss 40 fixed on the axle 2, engages. The boss 40 is joined at 41 with the fork 39, said fork and boss having registering holes, 42, 43, through which the pin 41 passes.

In the branches of the fork there are other holes 42', 42' registering with a hole 43' in the boss 40 for the purpose hereinafter explained.

The following results are obtained by means of this arrangement.

1. During work, when an implement is coupled to the tractor, the wheel 5 being raised, the longitudinal beams can pivot around the pin 41, but their displacement is limited by the stop-piece formed by the top part 39'. As long as the boss does not rest against the said top part, the springs act normally as a resilient support for the whole chassis 1.

2. At the time when the wheel 5 is lowered preparatory to travel on the ground and from the moment when this wheel rests on the ground, it lifts the chassis. When, during this lifting, the holes 42' are opposite hole 43' a pin 44 is passed through these holes and pivotal movement of the chassis on the axle is thus prevented. The weight of the tractor can then be exerted on the front wheel without causing angular displacement of the chassis with regard to the axle and the tractor acts as an ordinary three-wheel tractor.

The chassis 1 supports, in the ordinary way, the motor 4 and its clutch. There is a sleeve 7 on the axle 2 (Fig. 6) the said sleeve having a downward prolongation or extension in the form of a heavy rod 8 acting as a pivot and engaging, as will be seen later, in a socket of the coupling cross-piece. The sleeve 7 is prolonged at the top by a piece 9 supporting a change speed gear box 10.

The coupling cross-piece 11 has the form represented in Figs. 1, 4 and 5. In the front-part of this cross-piece there is formed a socket 11' to receive the rod 8 of which mention has been made. In the rear part of the cross-piece there are a certain number of substantially-cylindrical, horizontal orifices 12. These orifices constitute the part of the coupling between the tractors and the machine or vehicle coupled with it, the said machine or vehicle being provided with a connecting member of any suitable form to fit therein.

It is to be observed that owing to the provision of the multiple orifices 12, it is possible to mount the machine at different heights; thus any kind of machine or implement can be coupled to the tractor. In the particular case of plows (or other machines which require somewhat precise regulation of height) the special mounting device shown in Fig. 7, is adapted for attachment to the cross-piece 11. This device comprises two coupling pins 13 or the like fitting into the openings 12, these pins terminating at their rear ends in sleeves or sockets through which extends an endwise movable vertical rod 15 operated by a hand wheel 14, said rod terminating at its lower end in a coupling socket 12', similar to socket 13, to receive the sleeve or connecting member of the plow or other machine to be coupled. This device makes it possible to couple any kind of machine or implement with the tractor but, once coupled, such machine forms a rigid unit with the tractor in the longitudinal direction.

A modified form of coupling is shown in Figs. 9 and 10.

In the orifices 12 of the cross-piece 11 two coupling pins 13—13' (Fig. 9) engage. These coupling pins are cylindrical and parallel and are structurally independent of

the machine to be coupled. Keys 38 secure the pins 13—13' in the longitudinal direction.

The pins 13 terminate on the side of the machine to be coupled in a fork 13^a, each limb of which is formed with two holes for axle pins 30—31. The gap between the limbs of this fork is, for a purpose indicated later, wider where pin 31 traverses it than where pin 30 traverses it.

The pin 13' is formed with a transverse hole 32 in line with pin 30. It can, when necessary, be prolonged and pierced lengthwise with a second hole in line with pin 31.

The part 33, rigidly fixed on the machine to be coupled (for example the pole of a plow) is formed at the extremity so that it can engage with the fork 13^a. It has two thicknesses which correspond to the two widths of the gap in the fork and it is perforated with two holes registering with those in the fork so that, as required, the pins 30 and 31 can be passed through the fork 13^a, and through the parts 33 and 13'.

In these conditions—

1. If an entirely rigid coupling is required, the pins 30 and 31 are engaged in their respective holes in the pieces 13, 13'. In this case the steering of the tractor is effected by the wheel 18, pinion 17 and sector 16.

2. If it is required to allow the tractor and the coupled machine to form an angle with each other in the horizontal plane to facilitate turning, the pin 31 is removed. In this case there is a swinging or pivotal movement in the horizontal direction, around the axis of pin 30; the angular displacement can be limited between any two points by means of stop pieces placed on a sector 34, either between the symmetrically placed stop pieces 35, 35', or 36 and 36', or unsymmetrically between the stop-pieces 37 and 35' or 35 and 37' &c. according to the needs of the work. In this case the front wheel can be replaced by a steerable wheel the height of which above the ground can be regulated by the aid of a suitable device. In this case steering is operated, once the wheel is raised, by braking one of the wheel axles, this braking being operated by working the right brake or the left brake to enable all turnings to be made within the limits determined by the angular displacement of the coupling.

3. If it is desired to impart to the machine, while rigidly coupled to the tractor in the horizontal plane, a rotation with respect to this tractor, around the longitudinal axis of the system, the coupling action of the member 13' is done away with, the pin 30 being replaced by a shorter pin which does not reach the coupling member 13', the pin 31 and, of course also pin 30, remaining engaged in the fork 13^a.

4. Finally for the coupling to be articu-

lated in all directions, the front wheel being steerable and the tractor constituting a three wheel tractor, the pin 30 is removed, the thinner part of the piece 33 is placed in the wider part of the form, and a pin 31', of less diameter than pin 31, is threaded in the holes opposite; thus, thanks to the play existing between the parts, an articulation of the system in a vertical direction is obtained.

This modified construction, as can be seen, enables any system for coupling a plowing machine to a tractor, from a coupling rigid in all directions to a coupling articulated in all directions to be easily obtained as required.

The front part of the coupling cross-piece 11 is provided with the steering sector 16; this sector gears with a pinion 17 keyed on the steering post, control being obtained by the aid of the wheel 18. In this apparatus the wheels 3 are both driving and steering wheels. However, when the tractor is to travel alone—viz: without being rigidly coupled with a machine or vehicle,—the front wheel 5 must be made a steering wheel. This can for example be obtained by connecting said wheel with the steering gear by some suitable transmission such as a horizontal chain guided on rollers or in a channel, this chain passing over a pinion which during the steering operation rotates a pinion mounted on a vertical rod rigidly connected with the fork of the front wheel. By means of a key or by mounting on a square shaft, the pinion can be moved along the aforesaid rod, without ceasing to be controlled by the steering chain.

The wheel 5 can also be used for steering by means of mechanism such as that represented by way of example in Fig. 8, in which mechanism a rod 22 unites, by means of universal joints 22' 22'', the steering wheel 18 with wheel 5; a clutch device of any kind 23 makes it possible to connect the wheel 18 either to the steering post previously described (and which controls the sector 16 of wheels 3) or the rod 22. In the latter case, when the wheel 18 is worked, the endless screw 24 turns and rotates a wheel 25 fixed to socket 26 which in rotation moves the fork of wheel 5. This mechanism is mounted on the chassis by the aid of a support 27.

The wheels 3 of the tractor are preferably provided with wings to augment adherence of the device.

The change speed gear in box 10 (Fig. 6) is constructed to give, for example, three speeds (one for travel on the road and two others for agricultural work) and reversal. It presents the peculiarity of comprising a special shaft 19 which is worked by the motor through the agency of the change speed gear and can also be controlled at the same time as the driving wheels or independ-

ently of them. The shaft 19 enables the operation of a tool of any kind by means of a pulley or of a prolongation provided with an universal joint; the tool thus constituted can, moreover, be rigidly connected with the tractor. It is thus, in particular, that the apparatus can control a mechanical saw, a dynamo, dredger &c.

The special change speed gear box with its shaft 19 and the coupling cross-piece are also capable of being used simultaneously to form an actual motor winch, very useful in agricultural work.

The tractor is provided with change speed levers such as 20 to obtain one speed or another, or reversal, or to control the shaft 19 (with or without simultaneous control of the driving wheels) as required.

The tractor is provided with brakes of any suitable type acting on wheels 3 and controlled by a lever 21, these brakes acting as the driver requires, on one only of the driving wheels to turn around on the spot, or on both wheels.

No claim is made in this application to the special form of coupling means *per se* shown in Figs. 7, 9 and 10, this structure forming the subject-matter of a divisional application, filed Sept. 19, 1921.

What I claim and desire to secure by Letters Patent of the United States is:—

1. A tractor, particularly for agricultural implements, comprising a chassis, two driving wheels at the rear, a third wheel in front, means for adjusting said third wheel vertically, steering mechanism for the said driving wheels, and means for connecting the steering mechanism with the two driving wheels or to the front wheel as desired.

2. A tractor, particularly for agricultural implements, comprising a chassis, two driving wheels at the rear, a third wheel in front inoperative when the tractor is coupled to an implement but serving to support said tractor when uncoupled, a coupling cross piece on said tractor, and means whereby an implement can be coupled to said cross piece rigidly, or with relative freedom in the one or more directions as desired.

3. A tractor, particularly for agricultural implements, comprising a chassis, two driving wheels at the rear, a third wheel in front inoperative when the tractor is coupled to an implement but serving to support said tractor when uncoupled, a cross axle between the driving wheels, a coupling cross piece secured to said axle, said cross piece having a forward extension in the form of a sector and steering mechanism geared to said sector.

4. A tractor, particularly for agricultural implements, comprising two driving wheels, an axle therefor, a third wheel inoperative when the tractor is coupled to an implement but serving to support said tractor when un-

coupled, a chassis extending from the front wheel to the rear wheels' axle, means extending forwardly from said axle under the chassis to support the same resiliently when the front wheel is raised from the ground, and means for rigidly attaching the chassis to the aforesaid axle when the front wheel rests on the ground.

5. A tractor, particularly for agricultural implements, comprising two driving wheels, an axle therefor, a boss on said axle, a chassis having its rear portion connected for pivotal movement relative to said boss, a third wheel carried by the forepart of said chassis, means secured to said axle and extending forwardly under said chassis to resiliently support the same, and means for preventing the said pivotal movement of the chassis when the third wheel rests on the ground.

6. A tractor for agricultural implements, comprising a chassis; two driving wheels at the rear thereof; a front wheel movable into inoperative position when the tractor is coupled to an implement and into operative position to support the front part of the tractor when the latter is uncoupled; and steering mechanism connectible to said front wheel when the same occupies its second position, but disconnectible therefrom when it occupies its first position.

7. A tractor, according to claim 6, in which the front wheel has a threaded spindle associated with it whereby it may be raised directly upwardly into its inoperative position and thereafter lowered into its operative position in engagement with the ground.

8. A tractor for agricultural implements, comprising a chassis; a front wheel and a pair of rear wheels connected therewith; steering mechanism; and means for connecting the steering mechanism alternatively with the front wheel or with the rear wheels.

9. A tractor for agricultural implements, comprising a chassis; a pair of driving wheels; an axle therefor; a front supporting wheel connected with the chassis and movable into and out of inoperative position; spring means extending forwardly from said axle beneath the rear end of the chassis to

resiliently support the latter when said front wheel is in inoperative position; and means for rigidly connecting the chassis with the axle when the front wheel occupies its operative position.

10. A tractor for agricultural implements, comprising a chassis; a pair of driving wheels; an axle for said wheels having a lateral projection to which the chassis is pivotally connected at its rear end; a front supporting wheel connected with the chassis and movable into and out of inoperative position; spring means extending forwardly from said axle beneath the rear end of the chassis to resiliently support the said front wheel is in inoperative position; and a locking element engageable with the rear end of the chassis and the lateral projection on the axle to rigidly connect the same when the front wheel occupies its operative position.

11. A tractor for agricultural implements, comprising a chassis, the longitudinal beams of which are forked at their rear ends; a pair of driving wheels; an axle therefor having a pair of bosses engaged in the forks of said beams; pivots connecting said forks and bosses to enable a relative pivotal movement between the chassis and the axle; a front supporting wheel connected with the chassis and movable into and out of inoperative position; spring means extending forwardly from said axle beneath the rear end of the chassis to resiliently support the latter when the front wheel is in inoperative position; and a locking element engageable with each fork and the respective boss to rigidly connect the same when the front wheel occupies its operative position.

12. A tractor for agricultural implements; comprising a chassis; a front wheel and a pair of rear wheels connected therewith; a steering mechanism connected with the front wheel; a steering mechanism connected with the rear wheels; and a steering wheel common to both steering mechanisms and adapted to be alternatively coupled to either of them to operate the same.

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