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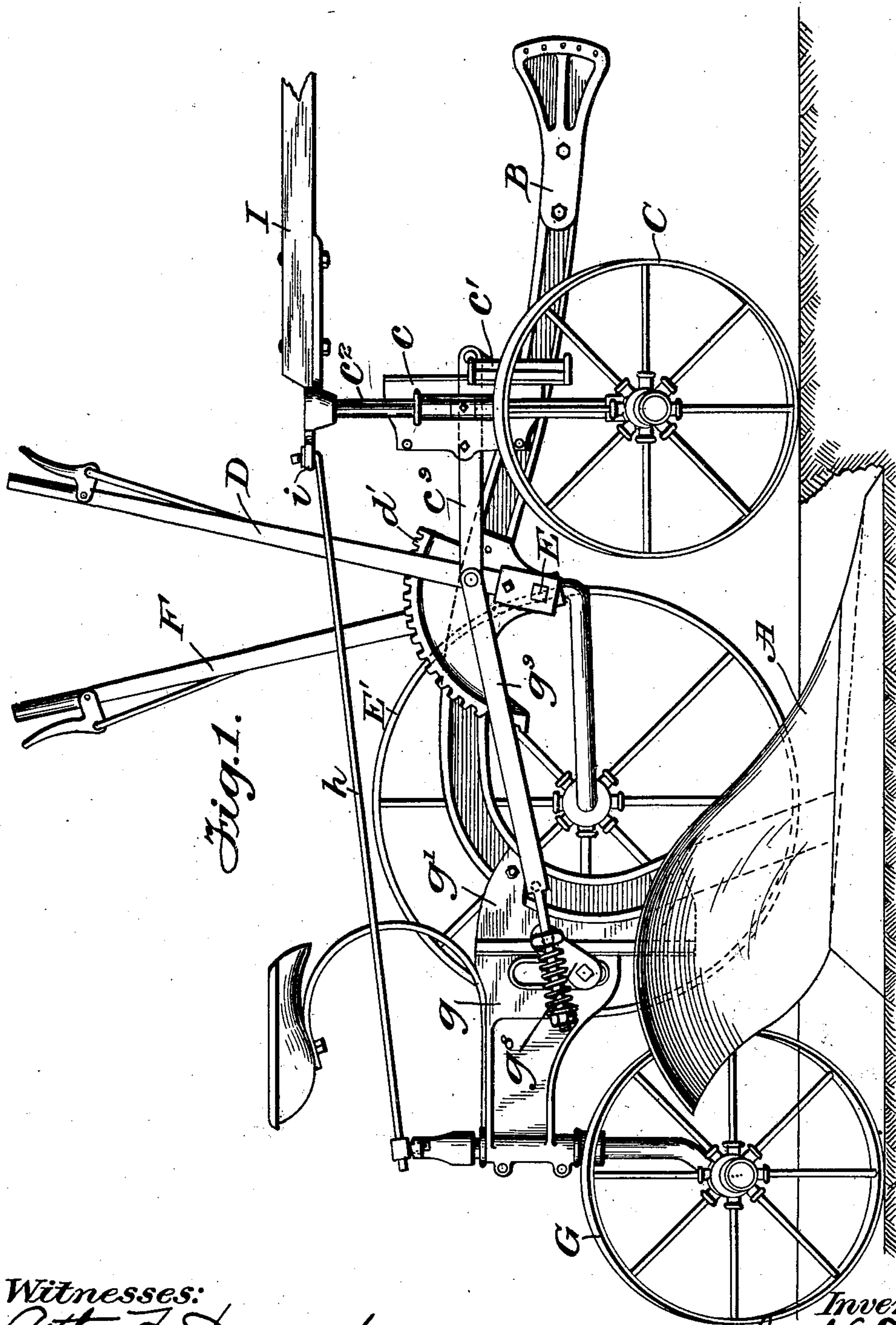
Patented Nov. 11, 1902.

J. A. FRENIER.
SULKY PLOW.

(Application filed Mar. 29, 1902.)

(No Model.)

4 Sheets—Sheet 1.



Witnesses:

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Inventor:

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By Chas. C. Buckley
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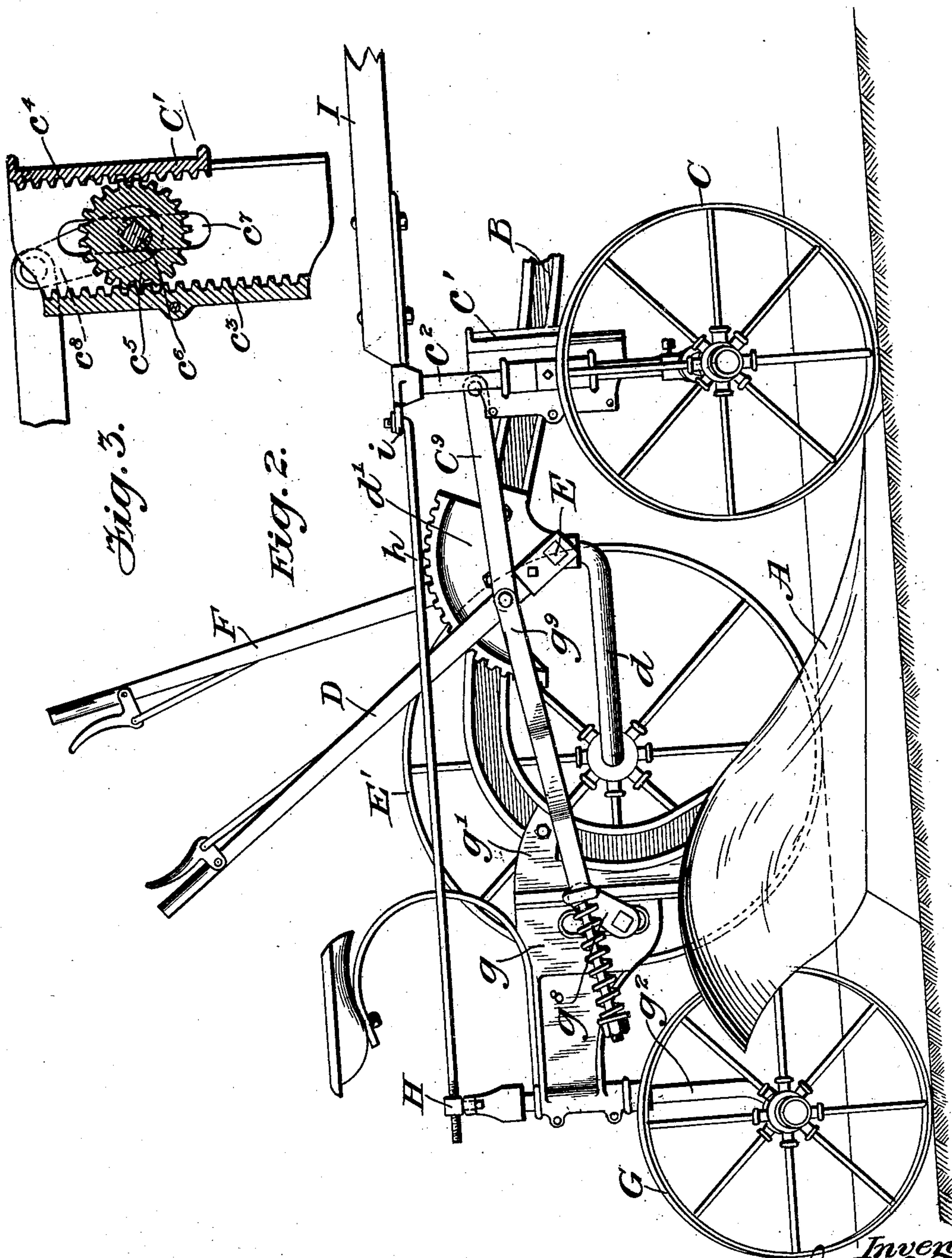
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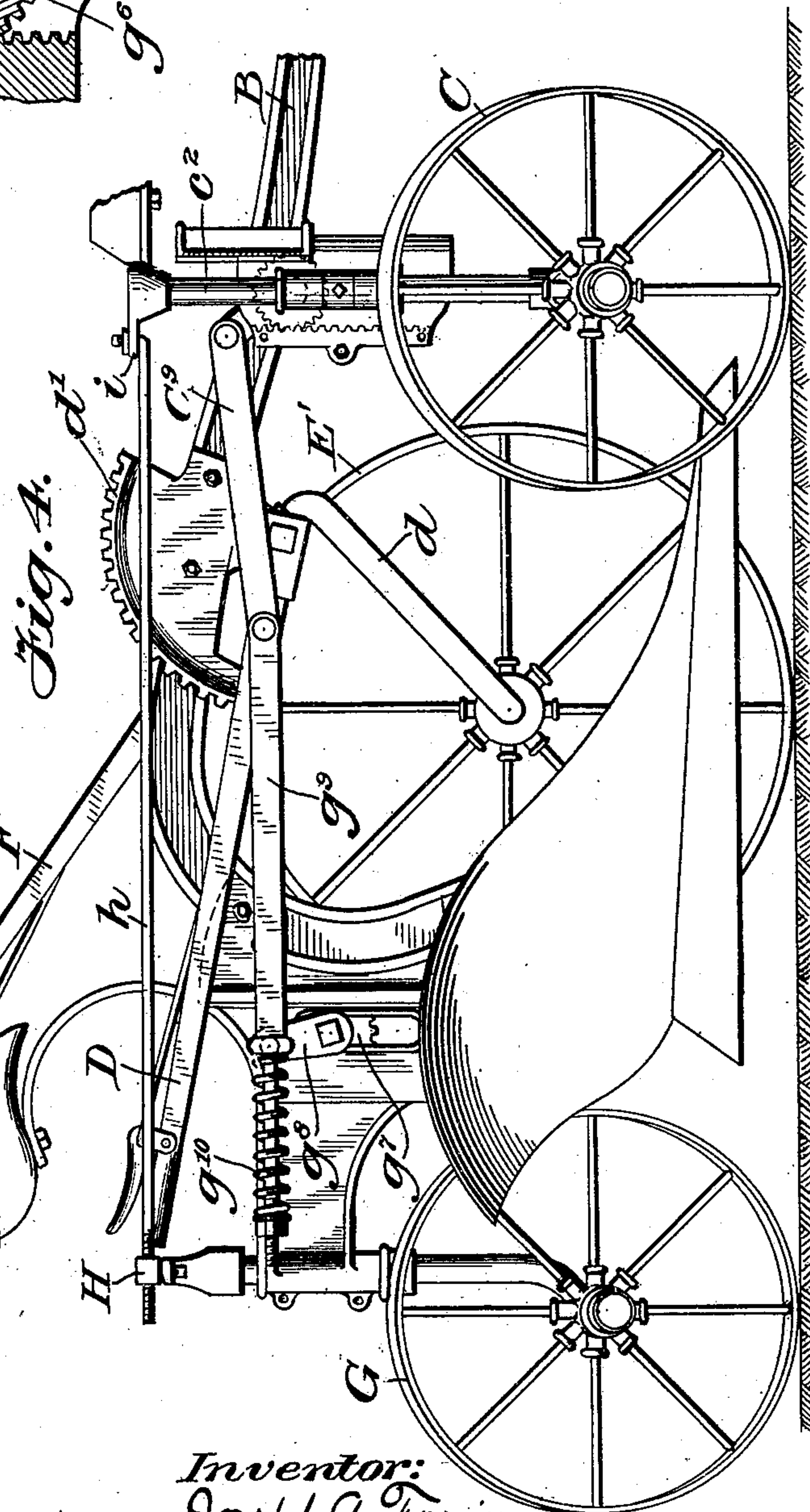
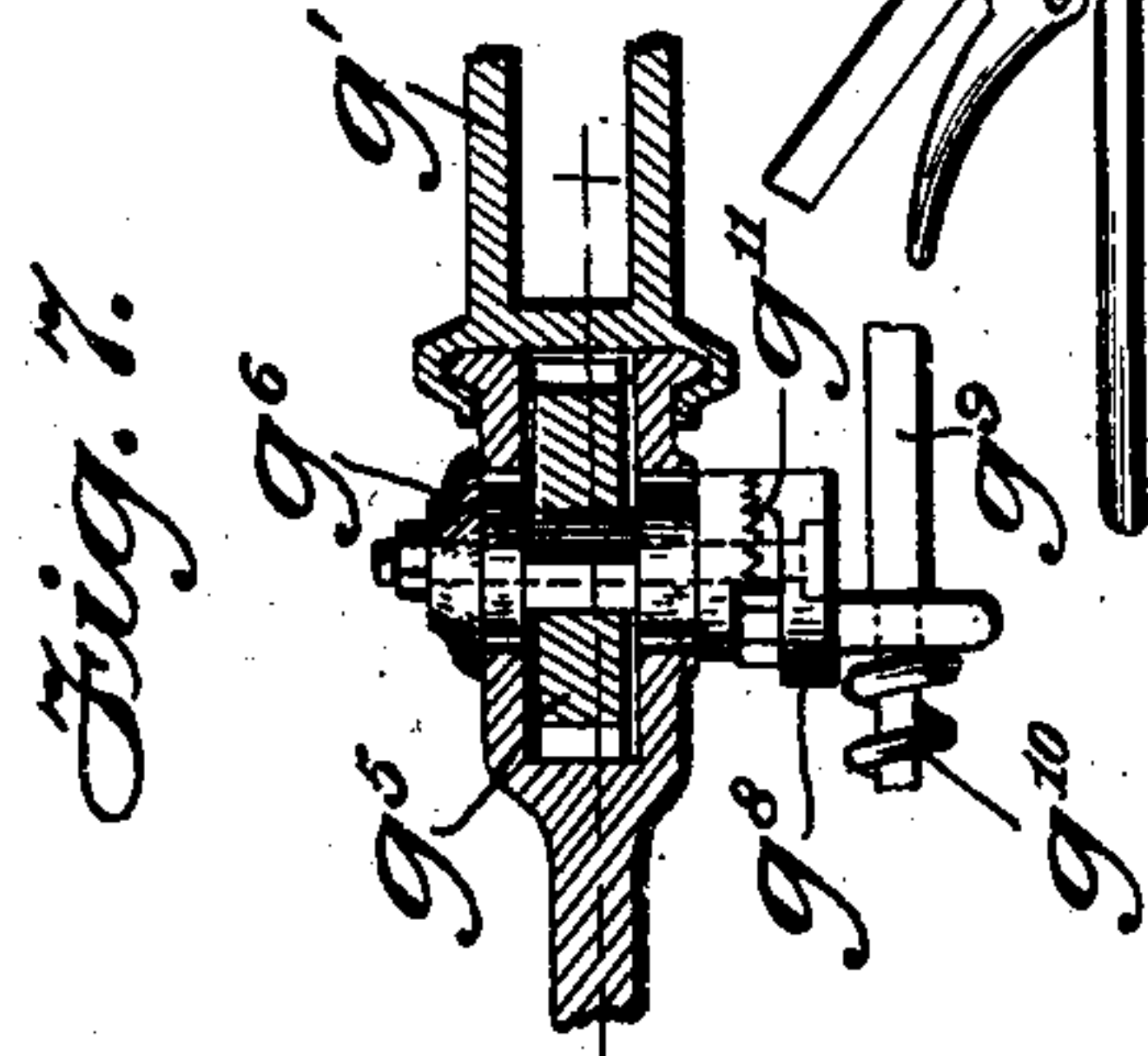
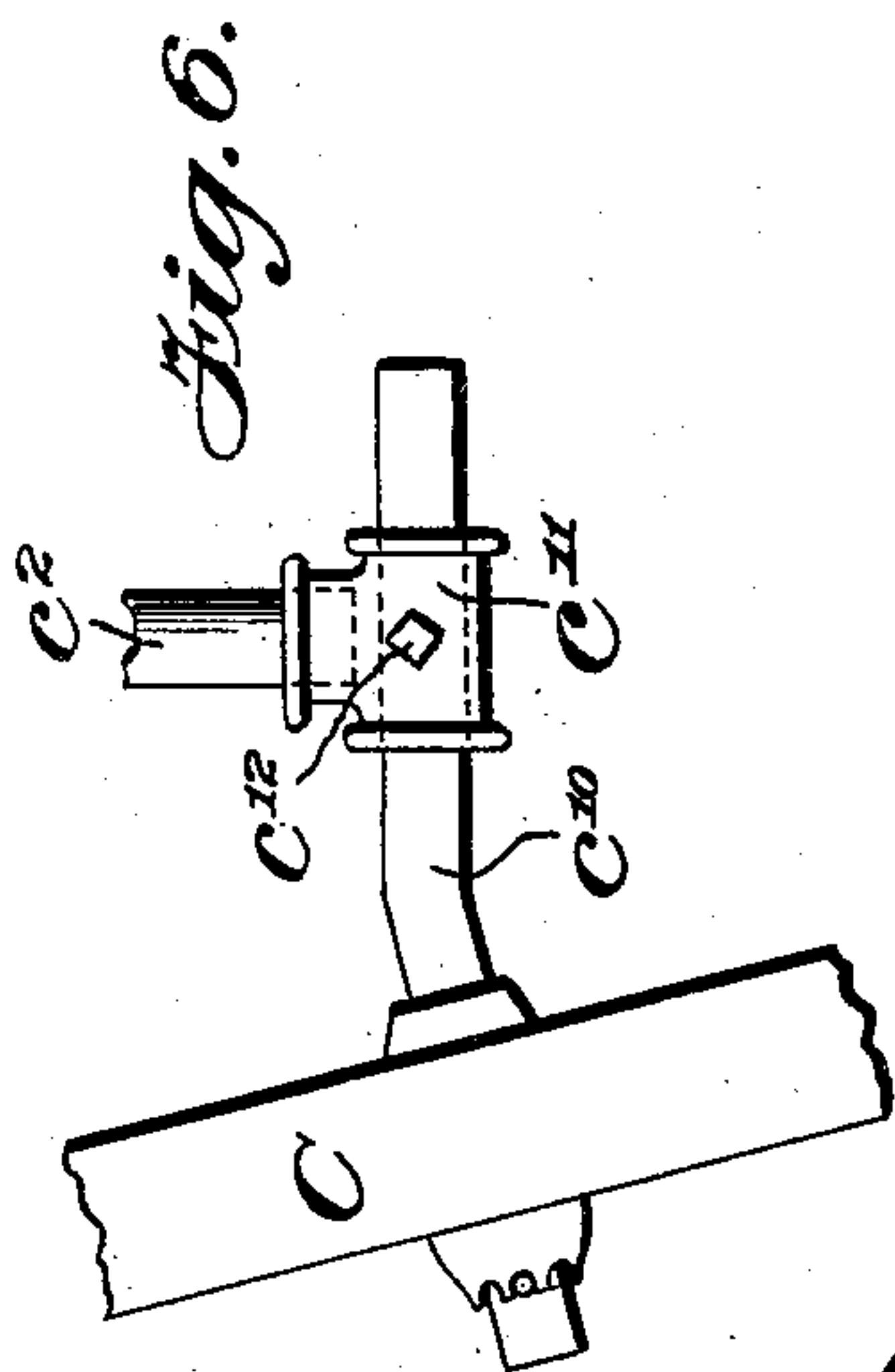
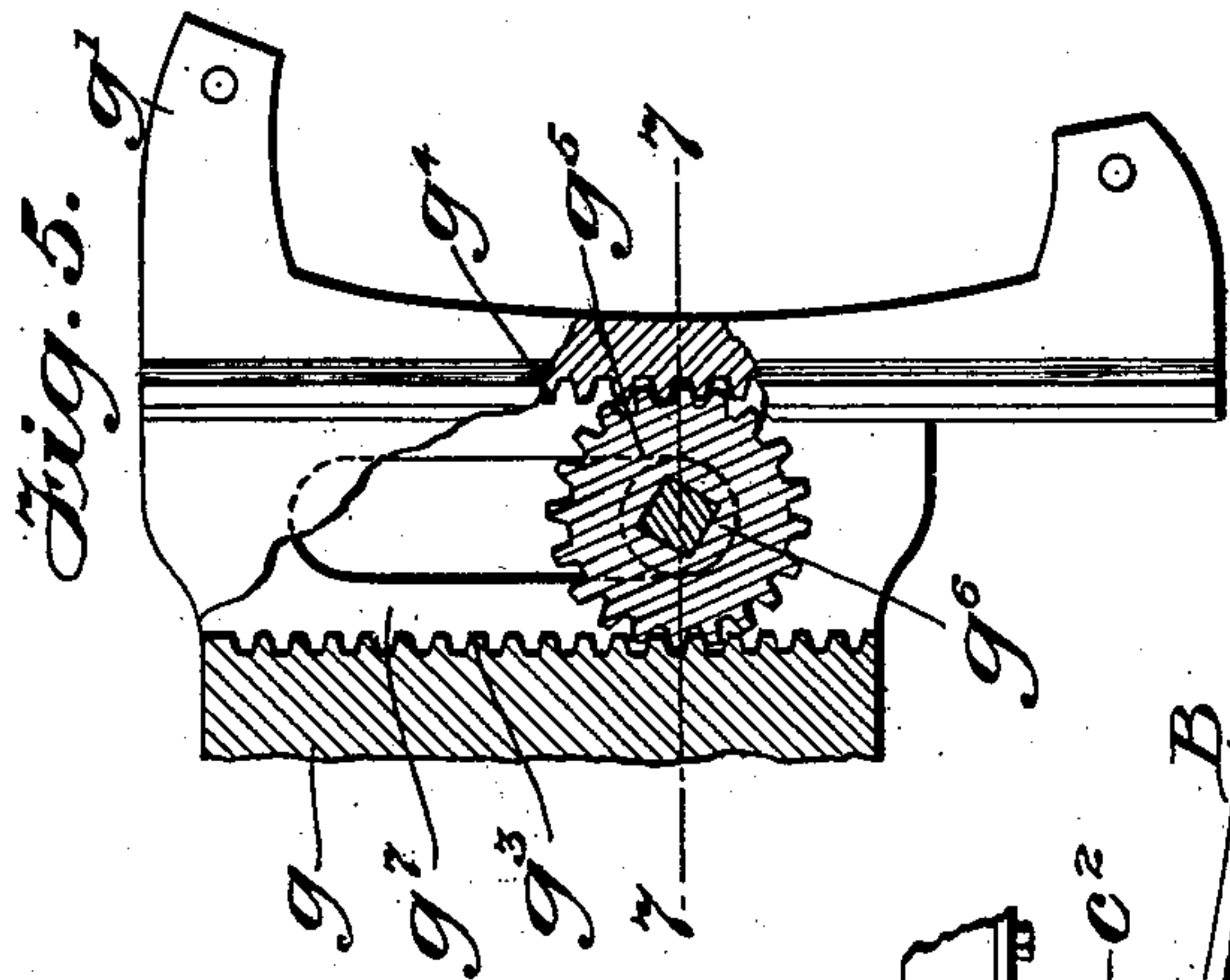
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4 Sheets—Sheet 3.



Witnesses:

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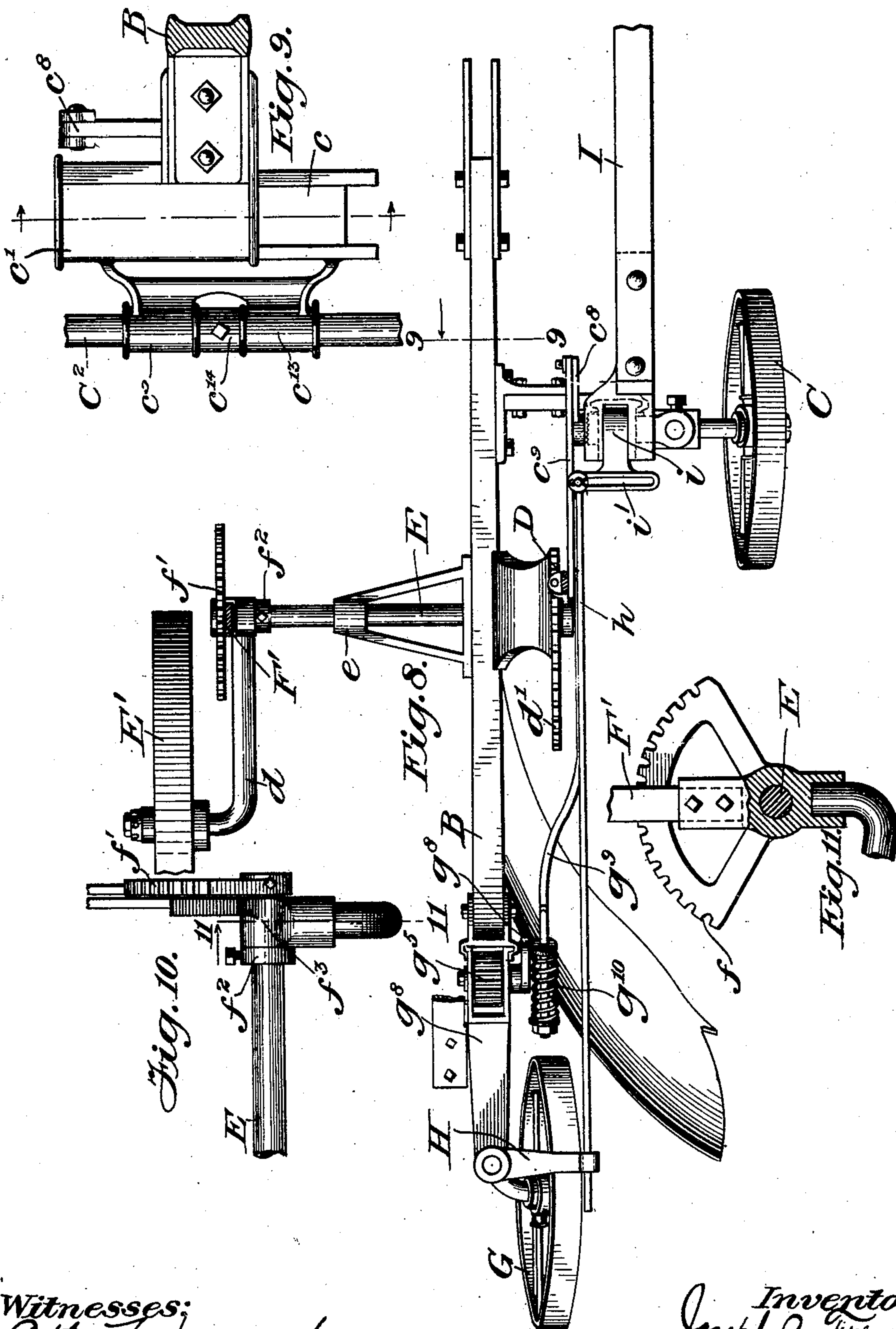
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SULKY PLOW.

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(No Model.)

4 Sheets—Sheet 4.



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UNITED STATES PATENT OFFICE.

JOSEPH A. FRENIER, OF DAVENPORT, IOWA, ASSIGNOR OF ONE-HALF TO
ALBERT B. FRENIER, OF DAVENPORT, IOWA.

SULKY-PLOW.

SPECIFICATION forming part of Letters Patent No. 713,086, dated November 11, 1902.

Application filed March 29, 1902. Serial No. 100,510. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH A. FRENIER, a citizen of the United States of America, and a resident of Davenport, Scott county, Iowa, have invented a certain new and useful Improvement in Sulky-Plows, of which the following is a specification.

My invention relates to that construction of wheeled or sulky plow involving a plurality of supporting-wheels having shifting connections with the plow-beam. In a plow of this character suitable means are usually provided for causing a relative shift between the wheels and plow, so as to permit the latter to be raised and lowered. It is also usually the practice to employ a construction and arrangement whereby one or more of the wheels can be controlled independently of the others.

The particular type of sulky-plow to which my invention relates is constructed with front and rear furrow-wheels and also with a land-side wheel. In operation the rear furrow-wheel travels behind the plow in the furrow being made, while the front furrow-wheel travels in the previous furrow. The land-side wheel, which is preferably controlled either simultaneously with or independently of the other wheels, is arranged to travel upon the unplowed surface of the ground. With this arrangement the wheels can be easily and readily controlled, and the machine is characterized by practically all of the known and approved methods of operation.

Generally stated, it is the object of my invention to provide a simple, efficient, and comparatively inexpensive wheeled or sulky plow of the foregoing type.

A special object is to provide an improved shifting connection between the forward furrow-wheel and the plow-beam.

Another object is to provide a similar improved connection between the plow-beam and the rear furrow-wheel.

A further object is to provide a simplified and improved arrangement for controlling the land-side wheel independently of the other wheels.

Another object is to provide an improved construction whereby the front furrow-wheel,

although tilted or inclined outwardly, may be adjusted laterally in a horizontal plane.

In addition it is also an object to provide certain details of construction and features of improvement tending to increase the general efficiency and to render a plow of this type more serviceable and reliable than heretofore.

To the foregoing and other useful ends my invention consists in matters hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a side elevation of a wheeled or sulky plow embodying the principles of my invention. In this view the relative adjustments between the plow and supporting-wheels are such as to permit the plow to make the first furrow. In such case, as will be observed, the land-side and front furrow wheels travel upon the unplowed surface of the ground, while the rear furrow-wheel travels behind the plow in the furrow being made. Fig. 2 is a view similar to Fig. 1, but showing the subsequent relative adjustment of the plow and wheels, so as to permit the front furrow-wheel to travel in the previous furrow. Fig. 3 is a detail sectional view of the rack-and-pinion connection between the front furrow-wheel and the plow-beam. Fig. 4 is a view similar to Figs. 1 and 2, but showing the plow lifted out of the ground. Fig. 5 is a detail sectional view showing the rack-and-pinion connection between the plow-beam and the rear furrow-wheel. Fig. 6 is a detail of the construction by which the front furrow-wheel although tilted outwardly may be shifted laterally in a horizontal plane. Fig. 7 is a detail sectional view on line 7 7 in Fig. 5. Fig. 8 is a plan of the plow shown in Figs. 1, 2, and 4, certain portions being shown in section and broken away for convenience in illustration. Fig. 9 is a section on line 9 9 in Fig. 8, showing the two relatively shifting castings which form the medium of connection between the front furrow-wheel and the plow-beam. Fig. 10 is a front elevation of the adjustable connection between the spindle or crank-arm of the land-side wheel and the crank-shaft. Fig. 11 is a section on line 11 11 in Fig. 8, showing the device illustrated by Fig. 10.

As thus illustrated, my improved wheeled or sulky plow comprises, preferably, a plow A, which can be of any suitable form or pattern and which is provided with the usual
 5 plow-beam B. As will be observed, all supplemental and unnecessary framework is dispensed with, the supporting-wheels being connected directly to the plow-beam. Hence, as will be observed, the connection between
 10 the forward portion of the plow-beam and the front furrow-wheel C consists, preferably, of two relatively sliding castings or members c and c' , the former mounted upon the spindle c^2 of the forward furrow-wheel and the latter upon the
 15 forward portion of the plow-beam. The casting c' is, it will be observed, fitted to slide vertically upon the casting or other member c . The oppositely-arranged vertical surfaces of these two castings or members are provided with rack-teeth c^3 and c^4 . These two
 20 opposing racks are engaged by the pinion c^5 , which, it will be seen, is arranged in the box-like structure composed of the two relatively sliding or shifting members. Thus arranged
 25 it will be seen that a rotation on the part of this pinion will cause a relative shifting or sliding movement on the part of the two castings or members, a rotation of the pinion in one direction causing it to rise bodily, carrying the casting c' and the plow-beam with it.
 30 A rotation of the pinion in the opposite direction, however, permits it to move bodily downward, allowing the casting c' of the plow-beam to settle to a lower plane. During this
 35 bodily rise and fall on the part of the pinion its short shaft c^6 moves up and down or plays in the slots c^7 in the side walls of the casting c . Any suitable arrangement may be employed for rotating this pinion; but as a mat-
 40 ter of further and special improvement this rotation is secured by connecting a lever D with the crank-arm c^8 by means of a link c^9 . The said crank-arm, it will be observed, is mounted at the end of the pinion-shaft c^6 . The said
 45 lever is preferably rigid with a transversely-disposed crank-shaft E, which carries the land-side wheel F. It will be readily seen that with this arrangement the rotation of the said pinion and the consequent relative movement be-
 50 tween the front furrow-wheel and the plow-beam can be secured by a forward or back movement of the lever D. In a similar manner the shifting connection between the rear furrow-wheel G and the rear portion of the
 55 plow-beam is secured through the medium of two similar sliding or relatively shifting castings g and g' . As in the previous case, the casting g' , which is secured to the plow-beam, is fitted to slide up and down on the casting g , which provides a bearing for the vertically-disposed spindle g^2 of the caster-wheel. The casting g is provided with a vertically-disposed rack g^3 , while the casting g' is provided with a similar and oppositely-arranged rack
 60 g^4 . Between these racks is interposed the pinion g^5 , which is provided with a short shaft g^6 . A relative and vertical shift or sliding move-

ment between the two relatively sliding members g and g' can be obtained by rotating this pinion, which causes a bodily up-and-down
 70 movement on the part of the latter. During this bodily and vertical shift the axis or shaft g^6 of the said pinion moves or plays in the slots g^7 , formed in the side walls of the casting g . The said axis or shaft g^6 is preferably pro-
 75 vided with a crank-arm g^8 , which is connected with the lever D by means of a link g^9 . With this construction and with the relative arrangement of parts shown the rear portion of the plow and beam can be raised and
 80 lowered by swinging the lever D so as to rotate the pinion g^5 one way or the other. A movement of the lever in one direction will, it will be observed, cause the pinion to move bodily upward, carrying the casting g' and
 85 the rear portion of the plow-beam with it, while a rotation of the pinion in the opposite direction will cause it to move bodily downward, allowing the plow-beam to settle to a lower plane. Both rotary pinions being con-
 90 nected with the lever D, it follows that the two furrow-wheels can be controlled simultaneously. It will be observed, however, that through the provision of the spring g^{10} the forward movement of the lever D beyond a
 95 certain point raises the forward furrow-wheel relatively to the plow without causing any further relative upward movement on the part of the rear furrow-wheel. In this way the said lever can be thrown forward from the
 100 position shown in Fig. 2, so as to relatively raise the front furrow-wheel above the plow, but, as stated, without shifting the position of the rear furrow-wheel relatively to the plow.
 The land-side wheel F, as will be observed, 105 is preferably mounted upon the spindle or crank-arm f' , which is swingingly mounted upon the transversely-disposed crank-shaft E. As a matter of further and special im-
 110 provement and in order to permit the said land-side wheel to be controlled independently of the other wheels the end of the shaft F is preferably squared to receive a segmental rack f' . A collar f^2 is also preferably se-
 115 cured upon said shaft. A collar f^3 on the upper end of the spindle f is preferably arranged between the rack f' and the rigidly-secured collar f^2 . It will be observed that the lever F' is secured to and rigid with the said loosely-mounted collar f^3 . The said le-
 120 ver is provided with a suitable locking-bolt adapted to engage the rack f' . With this arrangement the lever F' can be grasped and employed for controlling or adjusting the land-side wheel independently of the other
 125 wheels. It will be readily understood that any suitable means can be employed for holding the lever D at any point in its adjustment—as, for example, by providing it with the usual locking-bolt adapted to engage the
 130 rack d' , which can be secured to the plow-beam. With this arrangement the lever D can be grasped and employed for either controlling all three wheels simultaneously or

for controlling the front and rear furrow-wheels independently of the land-side wheel. The arrangement in this way permits the plow to be readily raised and lowered with the least possible exertion. Furthermore, the construction and arrangement permit the wheels to be given any and all of the known or approved adjustments relatively to the plow. In this way it will be seen that the plow is characterized by practically all of the known and approved methods of operation, while at the same time the weight and number of parts are reduced substantially to a minimum. In addition the shifting connections particularly between the front and rear furrow-wheels are of such character as to insure against the play or lateral yielding which might result from loose joints or a faulty construction. It will also be observed that, as previously explained, the arrangement entirely obviates the necessity of employing any framework.

As a matter of further and special improvement the spindle or standard of the forward furrow-wheel is preferably made in two sections, the upper section being vertical, as shown, while the lower section c^{10} is horizontal. Preferably, as shown and described, the said front furrow-wheel is tilted or inclined outwardly, so as to run properly in the furrow. Hence the portion upon which the furrow-wheel has its bearing is preferably tilted or inclined, as shown in Fig. 6. The horizontal portion of this spindle-section c^{10} is mounted for an endwise shift or sliding movement in a sleeve or collar c^{11} , mounted upon the lower end of the upper spindle-section. A set-screw c^{12} can be employed for holding the lower spindle-section against movement. In this way the front furrow-wheel can be shifted relatively to the plow, so as to change the width of the furrow. This lateral adjustment of the front furrow-wheel is obtained, it will be seen, without moving it up or down. In other words, although tilted or inclined outwardly it may be adjusted laterally in a horizontal plane.

As a further advantage, it will be seen that the caster-wheel can be swung clear around, inasmuch as it can be brought readily below the overhanging portion of the casting g . This rear furrow-wheel, as shown, is also preferably tilted or inclined away from the land side, so as to enable it to travel properly in the furrow. In order to prevent this rear furrow or caster-wheel from turning while the machine is running straight ahead, the crank-arm H on the upper end of the spindle g^2 is connected with the rear end of the tongue I by means of the rod h . Preferably the said tongue has a pivotal or vertically-swinging connection with the casting i , both being mounted upon the upper end of the spindle c^2 , whereby the front furrow-wheel swings or turns with the tongue. The forward end of the rod h is, it will be observed, arranged to engage a transversely-extending slot i' in the

casting i . When the machine is running straight ahead, as shown in Fig. 8, the casting i and the rod h keep the caster-wheel in the position shown in said figure. When the machine is swung to one side, however, as in changing the course of travel or in turning around, then the forward end of the rod h is free to move or slide back and forth in the slot i' , and consequently the wheel G is free to turn in the manner of an ordinary caster-wheel. In other words, the rear caster-wheel is automatically released as soon as the tongue is swung to one side. The spindle g^2 of this caster-wheel is, it will be understood, mounted to turn freely in the rearwardly-projecting or overhanging portion of the casting g . It will also be seen that the spindle of the forward furrow-wheel is mounted to turn in sleeves or collars c^{13} , preferably formed integral with the casting c . As a means for preventing relative shift or sliding movement between this spindle and the casting c , a collar c^{14} is interposed between the collars c^{13} and keyed or otherwise suitably secured to said spindle.

Any suitable arrangement can be employed for connecting the crank-shaft E with the plow-beam. For example, a bracket e , adapted to provide a suitable bearing in which the crank-shaft can turn, may be bolted or otherwise secured to the plow-beam, as shown in Fig. 8.

Thus it will be seen that, as stated, my improved sulky-plow has practically all of the necessary adjustments—that is to say, those adjustments which are necessary in view of certain approved methods of operation—and that at the same time the construction, while simple and involving no special framework, is nevertheless such as to insure the greatest strength and rigidity. Furthermore, the rear furrow-wheel maintains its distance from the plow throughout the scope of its adjustments. This prevents the rod h from turning or twisting the rear caster-wheel when the plow is raised from the ground. With the sliding connection employed between the rear wheel and the plow-beam the said wheel does not move toward and away from the plow when the latter is moved up and down. This is of great advantage, as it permits the plow to be raised and lowered without causing the rod h to twist or turn the caster-wheel. In addition it will be seen that my invention contemplates a lever arranged for simultaneously controlling all three wheels and having a spring or yielding connection with the rear wheel. As shown in Fig. 5, the crank-arms for the pinions can be adjustably connected with the latter, so as to permit the angle of the crank-arms to be adjustably changed for the purpose of securing the proper relative movements. For example, in Fig. 7 the crank-arm g^8 is adjustably connected with the short stud or shaft g^6 by means of a toothed formation, such as shown at g^{11} , so as to permit the said crank-arm to be set at any angle or position relatively to the pinion. In this way the

connections between the lever D and the pinions can be nicely adjusted in order to, as stated, insure the desired and proper relative movements and adjustments.

5 What I claim as my invention is—

1. In a wheeled or sulky plow, the combination of a suitable plow and plow-beam, a plurality of supporting-wheels including a rear 10
caster-wheel, two relatively and vertically sliding members serving as medium of connection between the plow-beam and said caster-wheel, a lever suitably connected and arranged for causing relative shift or sliding movement between the two members, and a 15
tongue connected with and arranged to control said caster-wheel.

2. In a wheeled or sulky plow, the combination of a suitable plow and plow-beam, a plurality of supporting-wheels including a rear 20
caster-wheel, two vertically and relatively sliding members serving as medium of connection between the caster-wheel and plow-beam, a vertically and bodily shifting rotary member interposed between said relatively 25
sliding members, means whereby the rotary and bodily movement of said rotary member causes the aforesaid vertical and relative sliding movement on the part of the said connecting members, and a lever connected and arranged for rotating said rotary member. 30

3. In a wheeled or sulky plow, the combination of a suitable plow, a plow-beam, a plurality of supporting-wheels including a rear 35
caster-wheel, a rack and pinion serving as medium of shifting connection between the caster-wheel and plow-beam, and a lever yieldingly connected with and arranged for rotating said pinion.

4. In a wheeled or sulky plow, the combination of a suitable plow and plow-beam, a plurality of supporting-wheels including a rear 40
wheel, two members fitted together for vertical relative sliding movement, said relatively sliding members serving as medium of connection between the said plow-beam and said 45
wheel, a vertically and bodily shifting rotary member interposed between said relatively sliding members, means intermediate each sliding member and said rotary member 50
whereby a rotation of the latter causes the aforesaid vertical and relative sliding movement between the two slidably-connected members, and a controlling member connected and arranged for rotating said rotary member. 55

5. In a wheeled or sulky plow, the combination of a suitable plow, a rear wheel having a vertically-sliding connection with the plow structure, a furrow-wheel having a similar 60
sliding connection with the plow structure, a land-side wheel having a shifting connection with the plow structure, a rotary member for each of said sliding connections, and a lever connected and arranged for simultaneously 65
rotating both said rotary members, so as to operate said sliding connections, and for also operating said shifting connection.

6. In a wheeled or sulky plow, the combination of a suitable plow and plow-beam, a plurality of supporting-wheels including a rear 70
wheel, two oppositely-arranged racks secured respectively to the plow-beam and the spindle of the said wheel, a pinion arranged between and engaging both of said racks, a short shaft upon which said pinion is mounted, vertical 75
slots in which said shaft is free to play or move up and down, a crank-arm on said shaft, a swinging hand-lever, and a link connecting said hand-lever with said crank-arm.

7. In a wheeled or sulky plow, the combination of a suitable plow and plow-beam, a plurality of supporting-wheels including a forward furrow-wheel, two oppositely-arranged 80
racks secured respectively to the plow-beam and to the spindle on which the furrow-wheel is mounted, a pinion arranged between and engaging both of said racks, a short shaft for said pinion arranged to move up and down 85
in vertical slots, a crank-arm on said shaft, a swinging lever, and a link connecting said 90
lever with said crank-arm.

8. In a wheeled or sulky plow, the combination of a suitable plow and plow-beam, a plurality of supporting-wheels including a forward furrow-wheel, a casting in which the 95
spindle upon which the said furrow-wheel is mounted is free to turn, a casting secured to the plow-beam and fitted to slide up and down upon the casting carried by the furrow-wheel spindle, a rotary member interposed between 100
said castings, means whereby rotation of said member causes vertical shift or relative sliding movement on the part of said castings, and a lever connected and arranged for rotating 105
said rotary member.

9. In a wheeled or sulky plow, the combination of a suitable plow and plow-beam, a plurality of suitable supporting-wheels whereof 110
one is a rear wheel, a spindle having a laterally-projecting portion upon which the said wheel has its bearing, a casting extending rearwardly from the plow-beam and provided with a bearing in which the said spindle is 115
free to turn, said casting overhanging in such manner as to permit the wheel to be twisted or turned clear around, and means for shifting 120
all of said wheels relatively to the plow.

10. In a wheeled or sulky plow, the combination of a suitable plow and plow-beam, a plurality of supporting-wheels including a 120
land-side wheel, a horizontally-disposed shaft mounted to turn in a bearing on the plow-beam, a rack secured to the outer end portion of said shaft, a collar secured upon said shaft inside of said rack, a crank-arm for the 125
land-side wheel having a collar portion loosely mounted on said shaft and arranged between said rack and rigidly-secured collar, and a lever rigid with said crank-arm and provided with a locking-bolt adapted to engage said 130
rack.

11. In a wheeled or sulky plow, the combination of a suitable plow or plow-beam, a rear wheel, a forward furrow-wheel, a rack-and-

pinion device serving as medium of shifting connection between the rear wheel and the plow-beam, a rack-and-pinion device serving as a similar medium of connection between the front furrow-wheel and the plow-beam, a horizontally and transversely disposed crank-shaft, a land-side wheel mounted upon the crank-arm of said crank-shaft, a lever rigidly secured to said shaft, and links serving as medium of connection between said pinions and said lever.

12. In a wheeled or sulky plow, the combination of a suitable plow and plow-beam, a horizontally and transversely disposed crank-shaft, a land-side wheel mounted upon the crank-arm of said crank-shaft, a lever rigidly secured to said shaft, a front furrow-wheel having a sliding connection with the plow-beam, a rear wheel having a sliding connection with the plow-beam, a rotary member for each sliding connection, means whereby rotation of said members causes a sliding action on the part of said sliding connections, and links connecting said rotary members with said lever.

13. In a wheeled or sulky plow, the combination of a suitable plow and plow-beam, a rear wheel, a rack-and-pinion device serving as medium of shifting connection between the said rear wheel and the plow-beam, a front furrow-wheel, a similar rack-and-pinion device serving as medium of shifting connection between the said front furrow-wheel and plow-beam, a lever connected and arranged for simultaneously rotating both of said pinions, so as to simultaneously control the front and rear wheels, a land-side wheel having a shifting connection with the plow-beam, and a lever connected and arranged for controlling said land-side wheel independently of the other wheels.

14. In a wheeled or sulky plow, the combination of a suitable plow and plow-beam, a plurality of supporting-wheels including a rear caster-wheel, a crank-arm on the upper end of the spindle of said caster-wheel, a suitable tongue, a casting at the rear end of said tongue provided with a transversely-extending slot, a rod having one end attached to said crank-arm and the other end arranged to slide freely in said slot, and a sliding connection between said caster-wheel and the plow-beam, said sliding connection consisting of two vertically and relatively sliding members, one carried by the plow-beam and the other by the spindle of the caster-wheel.

15. In a wheeled plow, the combination of a suitable plow and plow-beam, a plurality of supporting-wheels including a rear wheel, two relatively sliding members connecting the rear wheel with the plow-beam, a rotary member interposed between said sliding members, a crank-arm adjustably connected with said rotary member, a lever, and a link connecting said crank-arm with said lever.

16. In a wheeled plow, the combination of a suitable plow and plow-beam, a plurality of

supporting-wheels including a front furrow-wheel, two relatively sliding members connecting the front furrow-wheel with the plow-beam, a rotary member interposed between said sliding members, a crank-arm adjustably connected with said rotary member, a lever, and a link connecting said lever with said crank-arm.

17. In a wheeled plow, the combination of a suitable plow and plow-beam, a plurality of supporting-wheels including front and rear wheels, and a land-side wheel, a lever connected and arranged for simultaneously controlling all of said wheels, so as to raise and lower the plow, and a spring included in the connection between the said lever and the rear wheel, said spring being arranged to yield and thereby permit said lever to control the other wheels without causing relative movement between the plow and the rear wheel.

18. In a wheeled plow, the combination of a suitable plow and plow-beam, a plurality of supporting-wheels including a rear wheel, a sliding connection between said wheel and the plow-beam, a lever connected and arranged for simultaneously controlling all of said wheels, so as to raise and lower the plow, a rotary member for causing a sliding movement on the part of said sliding connection, and a spring yieldingly connecting said rotary member with said lever.

19. In a wheeled plow, the combination of a suitable plow and plow-beam, a plurality of supporting-wheels, a lever connected and arranged for simultaneously controlling all of said wheels, so as to raise and lower the plow, and a spring serving as medium of yielding connection between said lever and one of said wheels.

20. In a wheeled plow, the combination of a suitable plow and plow-beam, a plurality of supporting-wheels including a rear wheel, a rack and pinion serving as medium of shifting connection between the rear wheel and plow-beam, a lever connected and arranged for simultaneously controlling all of said wheels, so as to raise and lower the plow, and a spring yieldingly connecting said lever with said pinion.

21. A plow and beam, a rear wheel, a vertically-sliding connection between said rear wheel and beam, a front furrow-wheel, a vertically-sliding connection between said front wheel and the beam, a crank-axle, a land-side wheel on said axle, a lever connected and arranged for simultaneously rotating said axle and operating both of said sliding connections, so as to simultaneously control all of said wheels, and another lever for independently controlling said land-side wheel.

22. A plow and beam, a rear wheel, a vertically-sliding connection between said rear wheel and beam, a front furrow-wheel, a vertically-sliding connection between said furrow-wheel and beam, a crank-axle, a land-side wheel on said crank-axle, a lever connected and arranged for simultaneously con-

trolling all of said wheels, another lever connected and arranged for independently controlling the land-side wheel, and a tongue connected and arranged to control the said front 5 and rear wheels.

23. A plow and beam, a rear wheel, a rack-and-pinion device connecting the said rear wheel with the beam, a front furrow-wheel, a rack-and-pinion device connecting said 10 front wheel with the beam, a crank-axle, a land-side wheel on said crank-axle, a lever connected and arranged for simultaneously rotating said axle and operating both of said rack-and-pinion devices, so as to simultaneously control all of said wheels, another lever 15 connected and arranged for independently controlling the land-side wheel, and a tongue connected and arranged to control said front and rear wheels.

24. A plow and beam, a rear wheel, a vertically-sliding connection between the rear 20 wheel and the beam, a front furrow-wheel, a vertically-sliding connection between said front wheel and the beam, a crank-axle, a land-side wheel on said axle, a lever rigidly 25 secured to said axle, links connecting said lever with both of said sliding connections, another lever connected and arranged for independently controlling said land-side wheel, and a tongue connected and arranged 30 to control said front and rear wheels.

Signed by me at Davenport, Scott county, Iowa, this 17th day of March, 1902.

JOSEPH A. FRENIER.

Witnesses:

I. C. ANDERSON,
A. G. SAMPSON.