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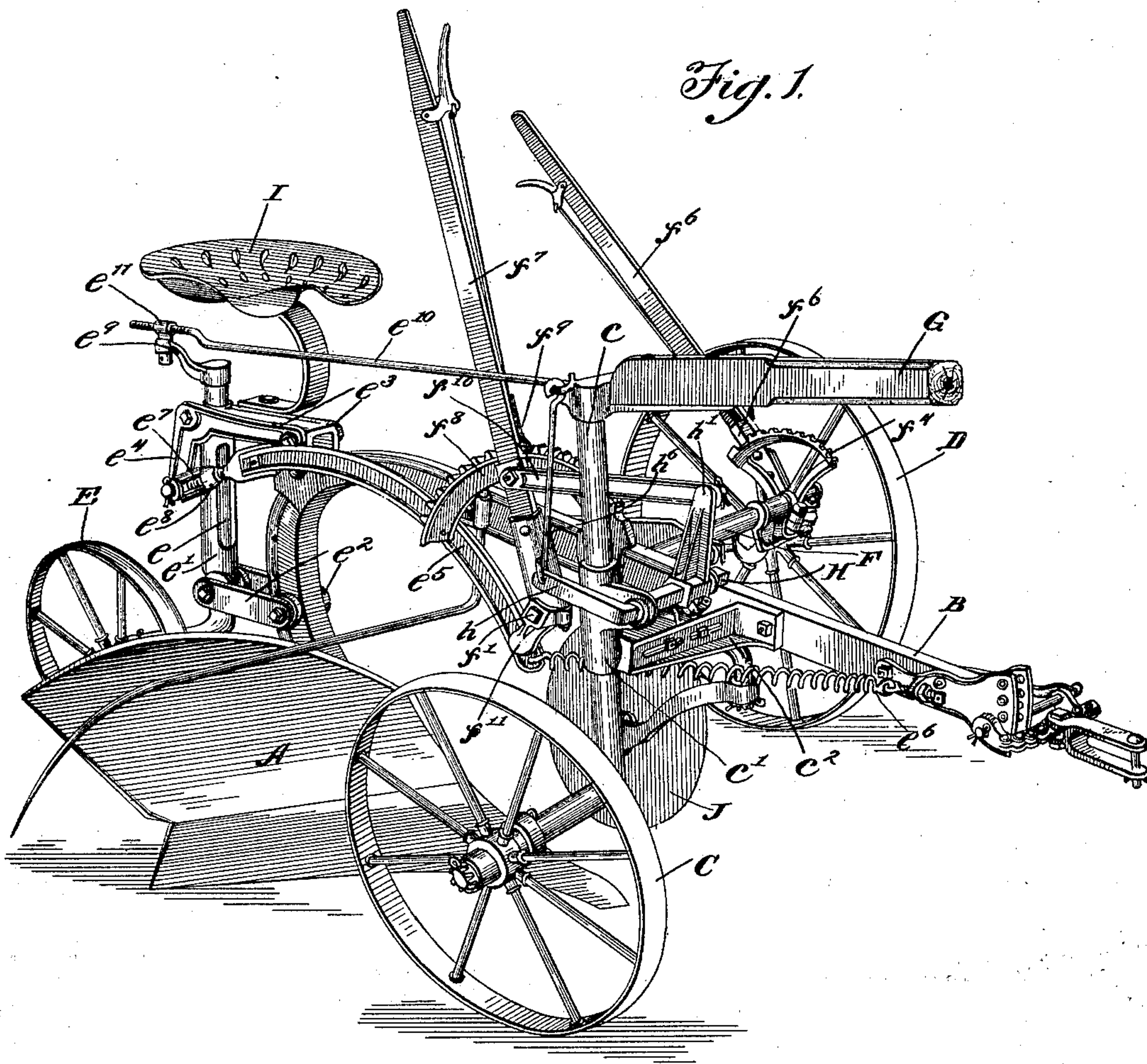
Patented Aug. 26, 1902.

S. H. TINSMAN.  
SULKY PLOW.

(Application filed Jan. 27, 1902.)

(No Model.)

5 Sheets—Sheet 1.



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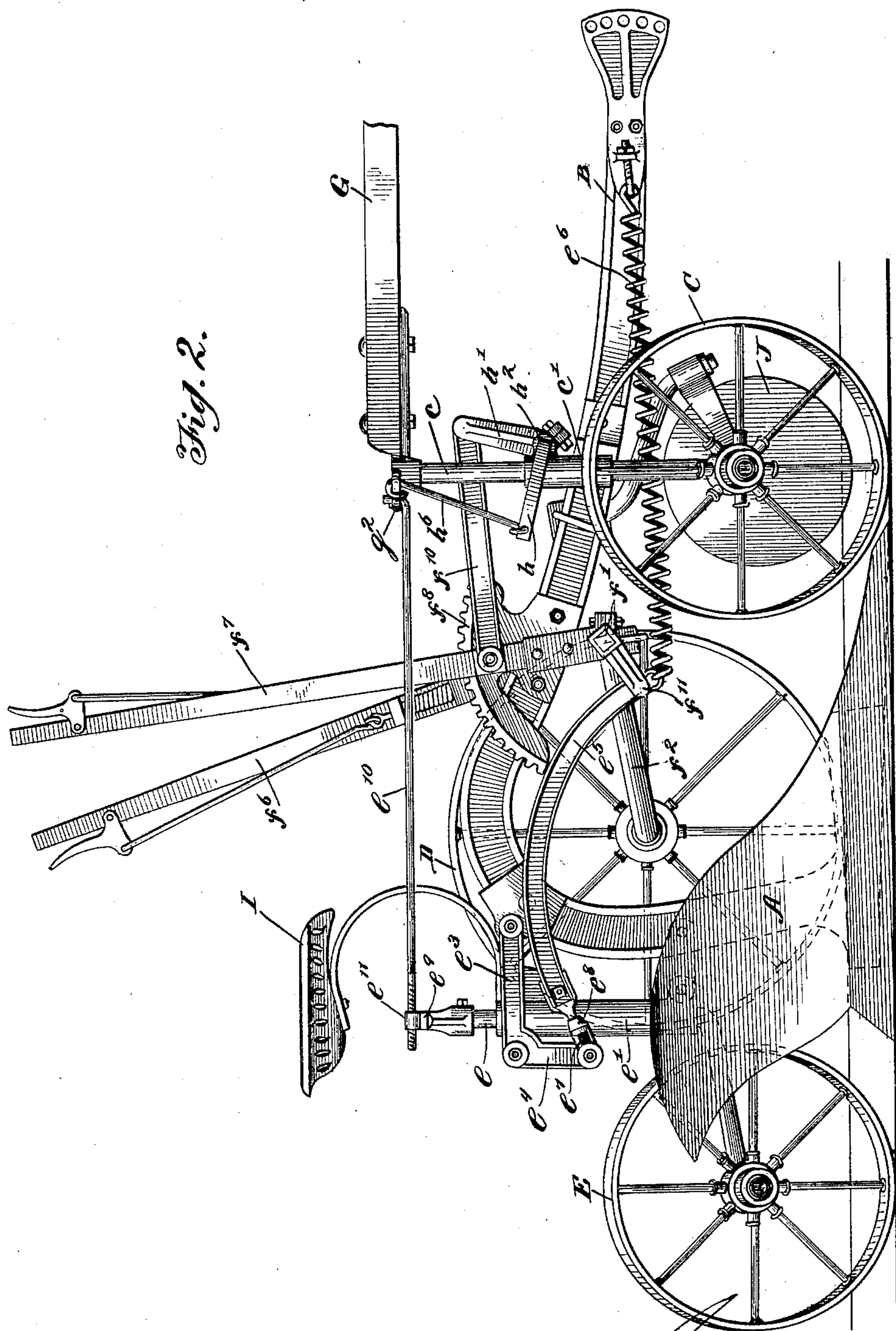
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(No Model.)

5 Sheets—Sheet 2.



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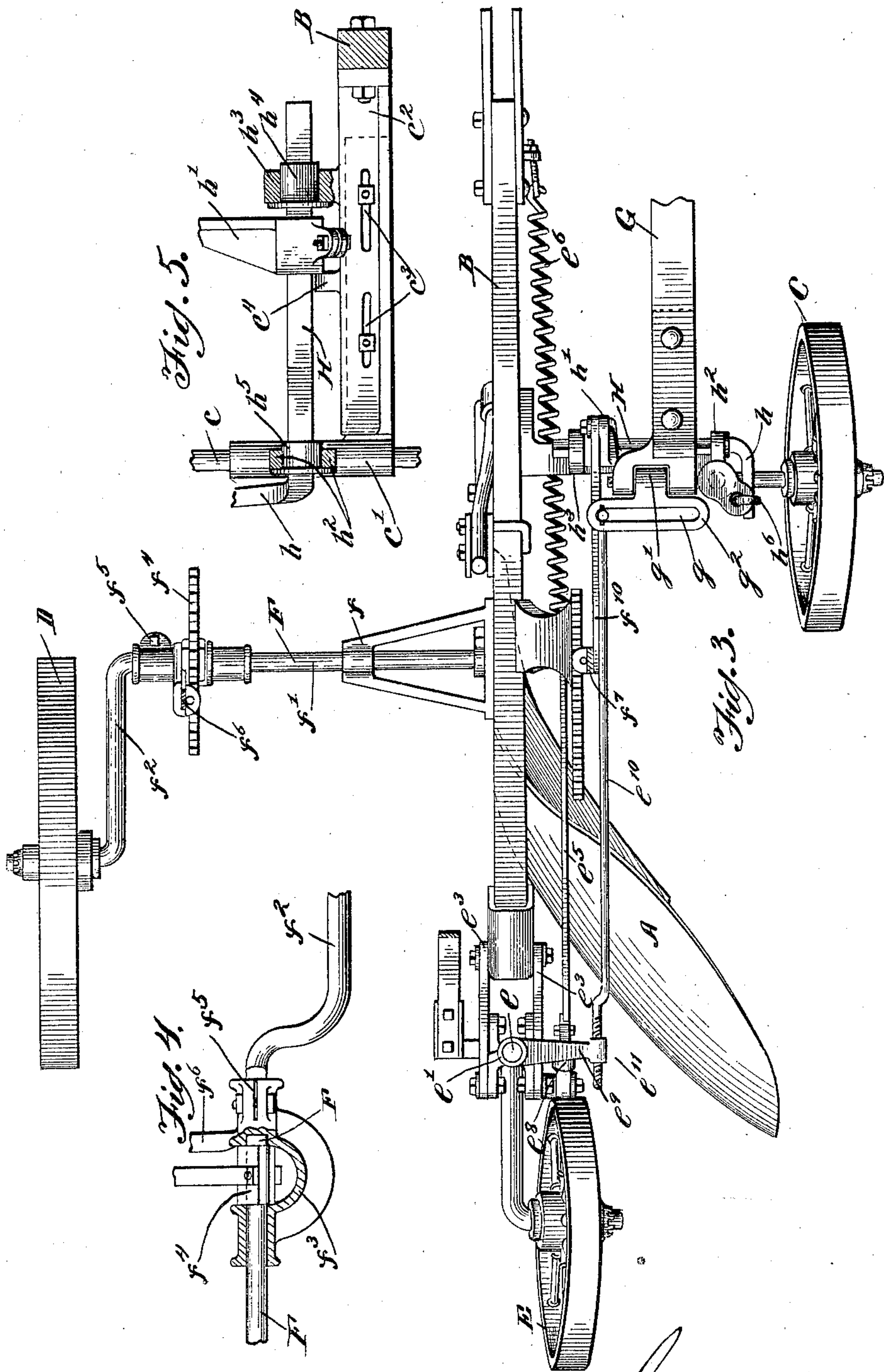
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5 Sheets—Sheet 3.



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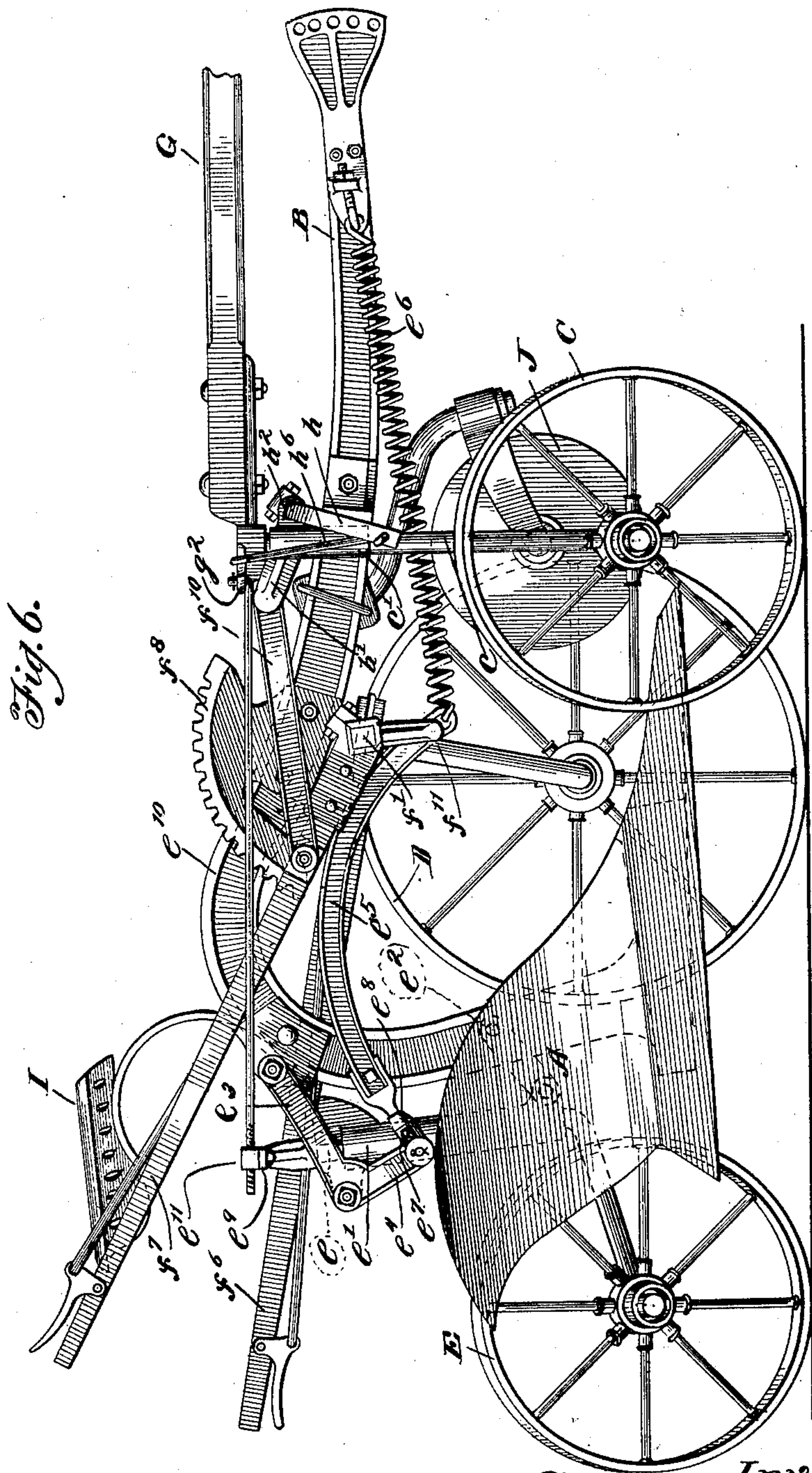
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(Application filed Jan. 27, 1902.)

(No Model.)

5 Sheets—Sheet 4.



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5 Sheets—Sheet 5.

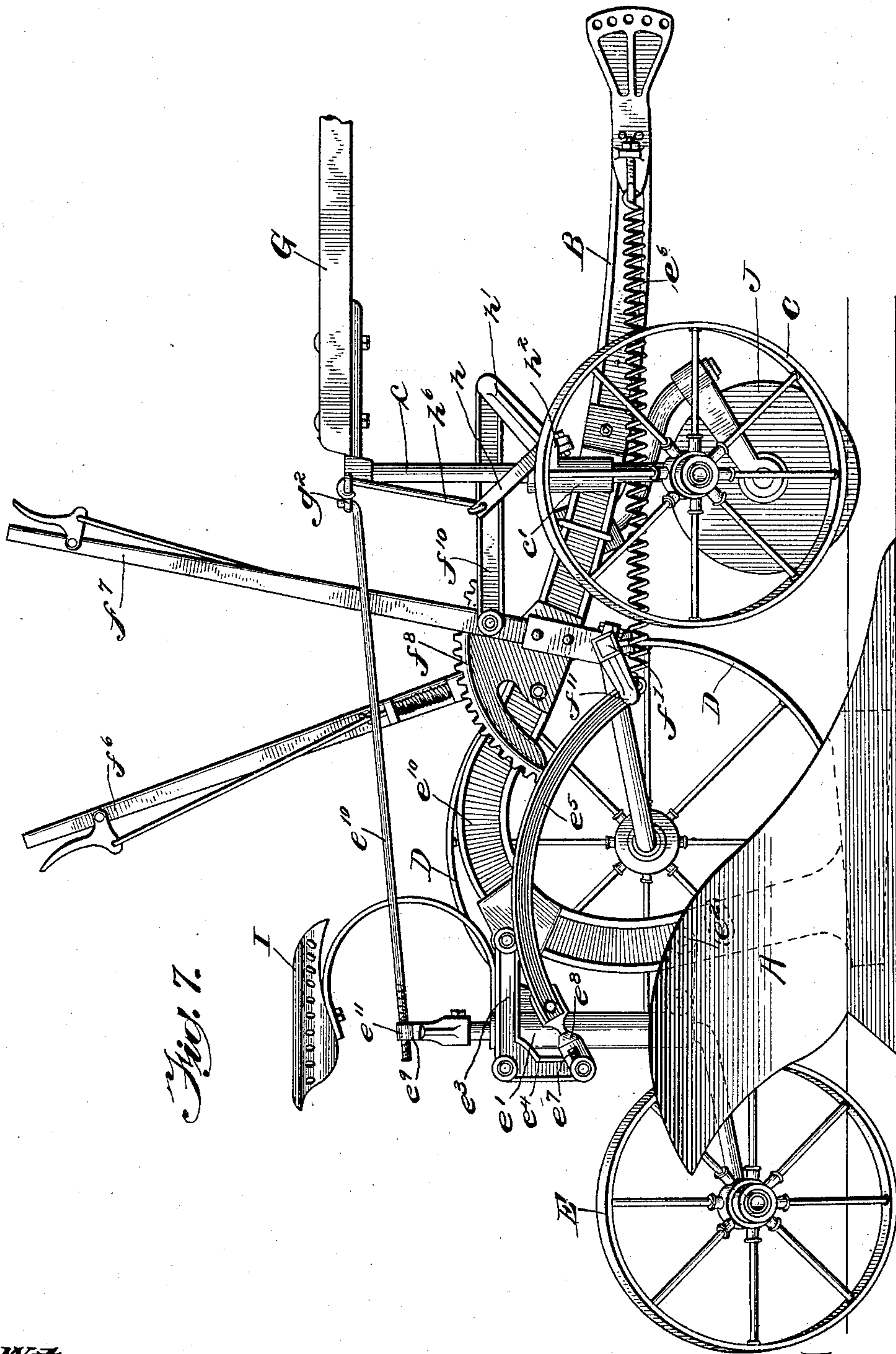


Fig. 7.

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# UNITED STATES PATENT OFFICE.

SAMUEL H. TINSMAN, OF DAVENPORT, IOWA, ASSIGNOR TO THE IMPLEMENT MANUFACTURING COMPANY, OF DAVENPORT, IOWA, A CORPORATION OF IOWA.

## SULKY-PLOW.

SPECIFICATION forming part of Letters Patent No. 707,879, dated August 26, 1902.

Application filed January 27, 1902. Serial No. 91,314. (No model.)

*To all whom it may concern:*

Be it known that I, SAMUEL H. TINSMAN, a citizen of the United States, residing at Davenport, in the county of Scott, State of Iowa, have invented a certain new and useful Improvement in Sulky-Plows, of which the following is a specification.

My invention relates to wheeled plows in general, but more particularly to plows of this character having a number of supporting-wheels, the arrangement being such that the wheels and the plow can be adjusted or shifted relatively for the purpose of either raising or lowering the plow, and especially to a plow of this description constructed without any special framework and in which the plow is characterized by what is known as a "high lift."

Generally stated, the object of my invention is to provide a serviceable and highly efficient construction of wheeled plow.

A special object of my invention is to provide a frameless wheeled plow having all of the essential elements and desirable characteristics of a frame-plow, but dispensing with all of the objectionable and undesirable features which usually characterize the latter.

It is also an object of my invention to provide a construction tending to reduce the weight and number of parts to a minimum, but at the same time insuring the requisite strength and rigidity.

A further object of my invention is to provide a construction and arrangement whereby all necessary or desired adjustments or manipulations of the machine may be accomplished readily and with the least effort.

Another object is to provide an improved and highly efficient and serviceable construction and arrangement whereby all of the supporting-wheels can be simultaneously controlled by a single hand-lever, so as to permit the plow to be bodily raised and lowered without the necessity of adjusting or manipulating more than one lever.

Another object is to provide a relative arrangement of the parts whereby the throw of the operating-lever beyond a certain point will confine the adjustment or relative movement to the forward supporting-wheels.

In addition to these it is also a special object

of my invention to provide an improved arrangement whereby the land-side wheel may be controlled independently of the other wheels.

A further object is to provide an improved arrangement whereby the tongue may be employed for holding the caster-wheel spindle against turning while the machine is running straight ahead, but which will permit the tongue to automatically release such caster-wheel when it is desired to alter the direction of travel or to turn the machine around.

Another feature of special improvement consists in connecting the caster-wheel with the tongue in such manner that the plow can be raised from the ground without throwing the caster-wheel out of alinement.

An improved arrangement for permitting the furrow-side wheel to be adjusted laterally is also provided, and in addition to this a spring is arranged to assist in raising the plow from the ground.

It is also an object of my invention to provide certain details and features of improvement tending to increase the general efficiency and to render a plow of this character more serviceable and satisfactory in use.

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

In the accompanying drawings, Figure 1 is a perspective of a wheeled plow embodying the principles of my invention. Fig. 2 is a side elevation of the plow shown in Fig. 1. Fig. 3 is a plan of the plow shown in Fig. 2. Fig. 4 is a detail sectional view showing the construction of the coupling or device for controlling the land-side wheel independently of the other wheel. Fig. 5 is a sectional view showing the devices for permitting a lateral adjustment of the furrow-side wheel relatively to the balance of the machine. Fig. 6 is a view similar to Fig. 2, but showing the position of the various parts when the plow is raised or lifted from the ground. Fig. 7 illustrates the extreme downward adjustment of the plow into the ground.

As thus illustrated the plow is of the frameless and high-lift type, it being observed that the plow-beam constitutes the only frame or body structure with which the machine is



provided and that the relative movement between the plow and the supporting-wheels is such that the plow is given a high lift—that is to say, the plow is raised or lifted from the ground to more than the usual extent. The wheeled plow thus constructed and operated comprises, preferably, a suitable plow A, a plow-beam B, and a number of supporting-wheels C, D, and E. The plow and beam are supported by these vehicle-wheels in such manner that the plow can be lowered into a working position, as shown in Fig. 2, or raised from the ground, as shown in Fig. 6. As stated, the plow-beam is the only body structure with which the machine is provided, and the said wheels are therefore preferably provided with shifting connections secured directly to the said plow-beam. For example, the land-side wheel D is preferably mounted on a crank-axle F, which is arranged to turn or rotate in a bearing  $f$ , which is bolted or otherwise suitably secured to the said plow-beam. This crank-shaft is preferably made in two sections, the inner section  $f'$  being arranged to turn in said bearing, while the outer section  $f^2$  is formed with the crank-arm and spindle upon which the wheel D is mounted. The two sections  $f'$  and  $f^2$  are preferably coupled together by a coupling or bracket  $f^3$  and the segmental rack device  $f^4$ . The axle-section  $f'$  is adapted to turn or rotate in the said coupling or bracket  $f^3$ , while the section  $f^2$  is squared at its end and clamped within the split portion  $f^5$  of said coupling or bracket. The segmental rack device  $f^4$  is also preferably split at its hub portion and clamped upon the axle-section  $f'$ . The hand-lever  $f^6$  is preferably rigid with the said coupling or bracket  $f^3$  and is preferably provided with a hand-operated locking-bolt 1. This locking-bolt is adapted to engage the teeth of said rack, and with this arrangement the said lever, the coupling or bracket, the outer axle-section  $f^2$ , and the wheel D are all rigidly connected and adapted to move or turn together. It will be seen, therefore, that when the locking-bolt 1 engages the rack  $f^4$  the two sections of the crank-axle are locked together, and the entire axle carrying the land-side wheel D can then rotate in its bearing  $f$ . Should it be desired, however, to control or adjust the land-side wheel independently of the other wheels, the locking-bolt 1 can be withdrawn from engagement with the rack  $f^4$ , and the operating-lever  $f^6$  can then be manipulated to rock or rotate the coupling or bracket  $f^3$  upon the axle-section  $f'$ , so as to cause a relative shift between the land-side wheel D and the balance of the machine. With respect to the simultaneous adjustment or control of the three supporting-wheels—that is to say, with respect to the bodily raising or lowering of the plow—the axle-section  $f'$  is preferably provided at its end with a hand-lever  $f^7$ , whereby the entire crank-axle can be rocked or rotated in its bearing  $f$ . As a means for locking this crank-

axle against rotation relatively to the plow-beam, the latter can be provided with a segmental rack  $f^8$ , adapted and arranged to be engaged by a locking-bolt  $f^9$  on the lever  $f^7$ . This locking-bolt, like the one previously described, can be operated by a small latch-lever arranged at the upper end of the lever, substantially as shown in the drawings. In order that this lever  $f^7$  may be rigidly secured to the crank-axle, the latter is preferably provided at its end with a squared portion, as shown in Figs. 1, 2, and 6, and the lower end portion of this lever can be split and provided with a clamping-bolt for clamping it upon said squared portion of the crank-axle. With this arrangement it will be seen that two adjusting-levers are provided, one rigid with the crank-axle, while the other is capable of movement independently of the main portion of such axle, whereby the entire crank-axle can be rotated or whereby only the end or crank-arm portion of such axle may be caused to move or swing relatively to the main section  $f'$ . As stated, the lever  $f^7$  is preferably connected and arranged for simultaneously controlling all of the supporting-wheels, so as to permit the plow to be raised and lowered bodily without the necessity of manipulating more than one lever. To such end the furrow-side wheel C is preferably mounted upon the outturned lower end portion of a vertically-disposed standard  $c$ , arranged in a sleeve or bearing  $c'$ . This sleeve or bearing is preferably provided with a portion which extends inwardly and which is bolted to the bracket  $c^2$ , the latter being in turn bolted or otherwise secured to the plow-beam. It will be observed that the bolts for securing this bracket  $c^2$  and the casting providing the sleeve or bearing  $c'$  are preferably arranged for adjustment in slots  $c^3$ , whereby the line of travel of the furrow-side wheel can be changed at will. The sleeve or bearing  $c'$  is adapted to slide up and down upon the standard  $c$ , and it will also be observed that the furrow-side wheel thus mounted is adapted to turn or swing with the tongue G. The rock-shaft H is preferably provided with a pair of crank-arms  $h$  and  $h'$ , and it is preferably mounted in bearings  $h^2$  and  $h^3$ . As will be observed, this rock-shaft is preferably squared for its full length, and while the crank-arm  $h$  may be integral with the rock-shaft the crank-arm  $h'$  is preferably made separate and adapted to be clamped in place. With respect to the lateral adjustment of the furrow-side wheel and as the said rock-shaft is preferably squared for its full length the bearings for the same are preferably provided with bushings  $h^4$  and  $h^5$ , which are cylindric and turn with the shaft. The bracket  $c^2$  is preferably provided with a lug  $c^4$ , which prevents the crank-arm  $h'$  from shifting sidewise when the parts are loosened and the furrow-side wheel adjusted laterally. A link  $f^{10}$  is preferably provided and arranged to serve as a medium of connection between the lever  $f^7$  and the



crank-arm  $h'$ . With this arrangement the said lever is connected with both the land and furrow-side wheels, so as to control both wheels simultaneously, and with the provision of the rock-shaft H and the sliding connections the furrow-side wheel can be adjusted laterally without disturbing or interfering with the proper operation of the power-transmitting connection between said lever and the furrow-side wheel. In other words, this furrow-side wheel may be adjusted laterally without moving the link  $f^{10}$  and the crank-arm  $h'$  out of alinement with the lever and without causing any of the different parts to cramp or bind. The crank-arm  $h$  is preferably connected with the upper end of the standard by a link or rod  $h^6$ . With this arrangement when the lever  $f^7$  is thrown forward the plow-beam is allowed to settle, as shown in Fig. 2, so as to bring the plow into a working position. During the lowering of the plow the crank-axle  $f$  rotates in its bearing and the sleeve or bearing  $c'$  slides downward upon the standard  $c$ . By drawing back the said lever, however, the plow can be raised or lifted from the ground, the backward movement of the lever causing the crank-axle to rotate in such direction as to lift the plow-beam and also causing the rock-shaft H to rock in a direction to in effect pull the sleeve or bearing  $c'$  upward upon the standard  $c$ . Thus while, as stated, the land-side wheel D is capable of independent control or relative adjustment the two wheels are also capable of simultaneous control or adjustment relatively to the plow and beam through the manipulation of a single lever. Furthermore, although the relative movement between the furrow-side wheel and the plow-beam is controlled by the lever, which is also capable of controlling the relative movement between the land-side wheel and the plow-beam, the furrow-side wheel is still free to turn with the tongue and follow the line of travel. The rear trailing or caster wheel E is preferably provided with a stem or spindle  $e$ , arranged to turn in a sleeve or bearing  $e'$ . With further respect to the said bodily raising and lowering of the plow the said sleeve or bearing  $e'$  is preferably connected with the rear portion of the plow-beam by means of upper and lower links  $e^2$  and  $e^3$ . These links, it will be observed, are preferably arranged in pairs, one at each side of the plow-beam and sleeve or bearing, and one of the upper links  $e^3$  is preferably provided with a downwardly-extending lever-arm  $e^4$ . The link  $e^3$  thus provided with a lever-arm  $e^4$  is adapted to serve as a bell-crank. The rear and downwardly-extending end portion of this bell-crank is connected with the lever  $f^7$ , preferably through the medium of a link or pull rod  $e^5$ . This link or rod is preferably arched, as shown in the drawings, so as to provide suitable clearance between its under side and the moldboard of the plow. The lever  $f^7$  is preferably provided with a relatively short and down-

wardly-extending arm  $f^{11}$ , to which the forward end portion of this link or pull rod  $e^5$  is pivotally connected. It will also be observed at this juncture that the forward end of this link or rod is preferably connected with the forward portion of the plow-beam by means of a spring  $e^6$ . The driver's seat I is preferably mounted upon the said sleeve or bearing  $e'$ . In this way the weight of the driver or operator is sustained by the rear trailing or caster wheel, and in raising the plow from the ground the plow and beam only are lifted and not the operator or driver. For the purpose of adjustment the rear end portion of this link or pull rod  $e^5$  can be reduced and provided with a screw-threaded portion  $e^7$ , adapted to engage a turnbuckle or adjusting-nut  $e^8$ . This turnbuckle or adjusting-nut  $e^8$  is pivoted to the rear and downwardly-extending arm of the bell-crank and can be removed and rotated for the purpose of either lengthening or shortening the said link or rod. With this arrangement the rear trailing or caster wheel, as well as the forward supporting-wheels, can be controlled by the lever  $f^7$ . When the said lever is thrown forward, as shown in Fig. 2, the links forming the swinging connections between the caster-wheel and plow-beam permit the plow to fall, the relative movement between the caster-wheel and the plow being upward, as far as the said wheel is concerned. When the said lever is drawn back, however, the pull exerted by the rod  $e^5$  upon the bell-crank causes the latter to lift the plow and rear portion of the plow-beam, the movement on the part of the caster-wheel then being downward, relatively speaking. The said links  $e^2$  and  $e^3$  form a serviceable and effective swinging connection between the plow-beam and the caster-wheel, and with the arrangement involving links located at either side the requisite strength and rigidity are secured without interfering with the relative movement between the caster-wheel and plow-beam. In other words, these links permit the plow and plow-beam to rise and fall readily and in the desired manner, but are so located and arranged as to effectively prevent any lateral play or movement of the sleeve or bearing  $e'$  relatively to the plow-beam. In this way the plow, although of the sulky or wheeled type, has practically the strength and rigidity of an ordinary walking-plow. The lever  $f^7$  has full control of all three wheels, so that the plow is raised and lowered by manipulating a single hand-lever. In raising the plow the spring  $e^6$  contributes to the power supplied through the lever  $f^7$  and tends to hold the plow in an elevated position. As previously stated, the arrangement is preferably such that the caster-wheel is prevented from swinging sidewise while the machine is going straight ahead, but is automatically released as soon as the tongue is swung to one side. For example, the upper end of the caster-wheel stem may be provided with a laterally-extending crank-arm



$e^9$ , and this crank-arm can be connected with the tongue by means of a rod  $e^{10}$ . The forward end of this rod is preferably arranged to engage a transversely-extending slot  $g$  in the casting, which forms a part of the connection between the tongue and the spindle  $c$ . A hinge or pivot  $g'$  is preferably provided between the tongue and the portion  $g^2$  having the said slot  $g$ . With this arrangement the tongue is free to swing up and down without changing the position of the portion  $g^2$ . The rear end of the rod  $e^{10}$  is preferably threaded and adapted to engage a threaded pivot  $e^{11}$  carried at the end of the arm  $e^9$ . With this arrangement the stem  $e$  will be held from turning while the machine is running straight ahead, as shown in Fig. 3. When the tongue is swung to one side, however, the forward end of the rod  $e^{10}$  is free to slide back and forth in the slot  $g$ , thereby automatically releasing the caster-wheel and permitting the latter to swing freely from side to side—as, for example, in altering the course of travel or turning the machine around. While the machine is running straight ahead there can of course be no longitudinal or end movement on the part of the rod  $e^{10}$ , and therefore the connection between the tongue and caster-wheel operates at such time to prevent the caster-wheel from swinging to one side; but when the tongue and the furrow-side wheel are turned to one side then the slot  $g$  permits free longitudinal or end movement on the part of the rod  $e^{10}$ , and consequently the caster-wheel, as stated, is free to swing to one side and to trail loosely in the desired manner. With respect to this arrangement whereby the tongue has a certain amount of control over the rear caster-wheel it will be observed that the lower links  $e^2$  are considerably shorter than the upper links  $e^3$ . This is for the purpose of securing a backward tilt on the part of the caster-wheel spindle when the plow is raised from the ground. In this way the raising and lowering of the plow does not tend to force or swing the caster-wheel to one side as a result of the shortened distance between the caster-wheel spindle and the plow-beam. This will be readily understood by referring to Fig. 6, wherein it will be seen that the plow is raised from the ground and that as a result of the relative proportions of the upper and lower links the caster-wheel spindle is inclined slightly to the rear. This has the effect of practically leaving the point of connection between the rod  $e^{10}$  and the crank-arm  $e^9$  where it was before the plow was raised from the ground—that is to say, by allowing the caster-wheel stem to tilt the rod  $e^{10}$  is not allowed to exert a rearward push, which would result in an undesirable cramping or swinging of the caster-wheel against the edge of the furrow. Consequently, as stated, the arrangement permits the tongue to be connected with and have a certain amount of control over the rear caster-wheel, and at the same time the arrangement prevents the rais-

ing of the plow from throwing the caster-wheel out of alinement.

It will be readily understood that any suitable draft appliance can be employed and that, if desired, the plow can be provided with the usual colter-wheel J.

With further reference to the raising and lowering of the plow it will be seen that the angle of the arm  $f^{11}$  and connections and relative arrangement are such that the limit of the downward adjustment of the plow-heel relative to the caster-wheel is substantially reached when the said lever is in the position shown in Fig. 2. In other words, the said lever when thrown forward from the position shown in Fig. 2 will not operate to further depress the heel of the plow relative to the rear wheel—that is, to any great extent—inasmuch as such forward movement of the lever produces little further rearward movement on the part of the link  $e^5$ . It will be observed, however, that a forward movement of the lever  $f^7$  from the position shown in Fig. 2 operates to further depress the toe or point of the plow, owing to the relative arrangement of the said lever and the crank-arm  $h'$ . In this way the plow can be lowered to any extent, and whether the plow is operated near the surface of the ground or at some depth below the point or toe of the plow will always be below the heel. This is particularly advantageous in making the first furrow, for in such case the plow must be lowered below the front furrow-wheel, and at such time if the plow-point is above the heel the draft will tend to pull the plow out of the ground. However, with the arrangement by which the plow-point is always below the heel when the plow is in the ground a satisfactory and efficient operation of the plow is always insured, regardless of whether the plow is operating near the surface of the ground or at a considerable depth. In Fig. 7 the plow is shown at the limit of its downward adjustment, and it will be seen that this extreme downward adjustment has been accomplished without producing further relative movement between the plow and the rear trailing or caster wheel. In other words, the relative arrangement of the lever and the connecting parts is such that the throw of the lever beyond a certain point limits or confines the relative movement to the forward supporting-wheels, inasmuch as this extreme adjustment of the lever produces practically no further tilt on the part of the bell-crank. In this way the two forward supporting-wheels can be adjusted to the same level, and by then throwing the lever forward to the full extent of its adjustment the plow will be lowered to an extent to permit the making of the first furrow, as shown in Fig. 7. Thus it will be seen that a wheeled or sulky plow constructed in accordance with my invention is of minimum weight and number of parts, considering the various adjustments and operations of which the plow is capable, and that the requisite strength and rigidity are secured



without the necessity of providing any framework. Furthermore, the construction and arrangement permits the plow to be raised to a greater extent than is usual with plows of this type, and in addition this high lifting of the plow is accomplished through the medium of a single hand-lever. Both levers are, however, as illustrated, conveniently located, and the arrangement is such that the driver or operator can readily and easily control all of the wheels. The construction and arrangement, although simple and involving few parts, permits any and all of the adjustments which are known to be necessary or essential to the proper working of a plow of this type.

What I claim as my invention is—

1. In a wheeled plow, the combination of a suitable plow and plow-beam, a crank-axle journaled in a bearing on said plow-beam, a land-side wheel mounted on said axle, a furrow-side wheel having a shifting connection with the said plow-beam, a rear caster-wheel having a shifting connection with said plow-beam, a swinging hand-lever secured to said crank-axle, and suitable connections between said lever and the furrow-side wheel and the caster-wheel, the said lever thereby being operative to simultaneously control all of said wheels, so as to bodily raise and lower said plow.

2. In a wheeled plow, the combination of a suitable plow and plow-beam, a crank-axle journaled in a bearing on said plow-beam, a supporting-wheel on said crank-axle, an upright spindle, a supporting-wheel carried by said spindle, a rear caster-wheel, a sliding connection intermediate of said plow-beam and said spindle, a hand-lever secured to said crank-shaft, suitable connections between said lever and said caster-wheel, suitable connections between said lever and said spindle, the said lever thereby being operative to simultaneously control said wheels, so as to bodily raise and lower said plow.

3. In a wheeled plow, the combination of a suitable plow and plow-beam, a plurality of supporting-wheels all capable of movement relatively to the plow and plow-beam, a crank-axle upon which one of said wheels is mounted, a crank-axle bearing secured to said plow-beam, a hand-lever rigidly secured to said crank-axle, and suitable connections between the lever and the other supporting-wheels, the said lever thereby being operative to simultaneously control all of said wheels, so as to bodily raise and lower the plow.

4. In a wheeled plow, the combination of a suitable plow and plow-beam, a crank-axle journaled in a bearing on said beam, a land-side wheel on said crank-axle, a vertical spindle, a furrow-side wheel carried by said spindle, a shifting connection intermediate of said plow-beam and said spindle, a rear caster-wheel, upper and lower links connecting said caster-wheel with the rear portion of said

plow-beam, a lever rigidly secured to said crank-axle, a link and rock-shaft for connecting said lever with the upper end of said spindle, a link and a bell-crank for connecting said lever with the rear caster-wheel, the said lever thereby being operative to simultaneously control all of said wheels, so as to bodily raise and lower said plow.

5. In a frameless high-lift wheeled plow, the combination of a suitable plow and plow-beam, a furrow-side wheel having a shifting connection with said plow-beam, a crank-axle journaled in a bearing on said plow-beam, said crank-axle being arranged back of said furrow-side wheel, a land-side wheel mounted on said crank-axle, a rear caster-wheel having a shifting connection with the rear upright portion of the plow-beam, a lever rigidly secured to said crank-axle, suitable connection between said lever and said caster-wheel, suitable connection between said lever and the furrow-side wheel whereby all three wheels may be controlled by said lever, and a second lever for independently controlling the said land-side wheel.

6. In a wheeled plow, a suitable plow and plow-beam, a rear caster-wheel having a stem, a bearing in which said stem is free to turn, upper and lower links connecting said bearing with said plow-beam, said links being arranged in pairs at opposite sides of the plow-beam, a land-side wheel and a furrow-side wheel having shifting connections with the plow-beam, a swinging lever having suitable connections with both the furrow and the land side wheels, and a pull-rod connecting said lever with one of said links, the said lever thereby being operative to simultaneously control all of said wheels, so as to bodily raise and lower the plow.

7. In a wheeled plow the combination of a suitable plow and plow-beam, forward supporting-wheels having shifting connections with the plow-beam, a rear caster-wheel provided with a stem, a bearing in which said stem is free to turn, links connecting said bearing with said plow-beam, said links being arranged in upper and lower pairs one at each side of the plow-beam, and a lever connected and arranged for causing relative shift between the plow-beam and the said bearing, so as to raise or lower the rear end of the plow-beam.

8. In a wheeled plow the combination of a suitable plow and plow-beam, forward supporting-wheels, a rear caster-wheel provided with a stem, a bearing in which said stem is free to turn, upper and lower links connecting said bearing with said plow-beam, one of the upper links being constructed to serve as a bell-crank, a swinging lever, and a pull-rod arranged to connect said bell-crank with said lever, the pull exerted by the said rod upon the bell-crank operating to lift the plow.

9. In a wheeled plow, the combination of a



suitable plow and plow-beam, a furrow-side wheel having a shifting connection with the plow-beam, a crank-axle journaled in a bearing on said plow-beam, a land-side wheel on  
 5 said crank-axle, a rear caster-wheel having a stem, a bearing in which said spindle is free to turn, upper and lower links connecting said bearing with said plow-beam, one of the upper links being adapted to serve as a bell-  
 10 crank, a swinging lever rigidly secured to said crank-shaft, a pull-rod arranged to connect said lever with said bell-crank, and a link and a rock-shaft forming medium of connection between said lever and the said furrow-side wheel, the said lever thereby being  
 15 operative to simultaneously control all of said wheels, so as to bodily raise and lower the plow.

10. In a wheeled plow, the combination of a  
 20 suitable plow and plow-beam, forward supporting-wheels having shifting connections with the plow-beam, a rear caster-wheel having a shifting connection with the plow-beam, a swinging lever having suitable connection  
 25 with the forward supporting-wheels, and an arched pull-rod arranged to connect the lower end of said lever with the connecting means between the caster-wheel and the plow-beam, the said lever thereby being operative to si-  
 30 multaneously control all of said wheels, and to raise and lower the plow.

11. In a wheeled plow, the combination of a suitable plow and plow-beam, forward sup-  
 35 porting-wheels having shifting connections with said plow-beam, a rear caster-wheel having a shifting connection with said plow-beam, a swinging lever suitably connected with said forward supporting-wheels, a pull-rod serving as medium of connection between  
 40 the lower end of said lever and the said caster-wheel, and a spring arranged and connected to exert a pull upon said pull-rod, the said lever thereby operating to simultaneously control all of said wheels, so as to raise  
 45 and lower the plow-hand, the pull of the said spring assisting in raising the plow.

12. In a wheeled plow, the combination of a suitable plow and a plow-beam, forward sup-  
 50 porting-wheels, a rear caster-wheel having a shifting connection with said plow-beam, a swinging hand-lever connected and arranged to cause relative shift or movement between said caster-wheel and the plow and plow-beam, and a spring connected and arranged  
 55 to assist said lever in causing relative shift between the caster-wheel and the plow-beam, the spring and lever cooperating to lift the plow.

13. In a wheeled plow, the combination of a  
 60 suitable plow and plow-beam, supporting-wheels whereof one is a land-side wheel, a crank-axle journaled in a bearing on the said plow-beam, said crank-axle being made in two sections, said land-side wheel being mounted  
 65 on the outer of said sections, a rack rigid with

the section of the axle journaled in said bearing, a coupling holding the two sections end to end, the coupling being rigid with the outer section and arranged to turn on the inner  
 70 section, a lever rigid with said coupling, and a locking device carried by said lever and adapted to engage said rack, whereby the land-side wheel can be adjusted independently of the balance of the machine.

14. In a wheeled plow, the combination of a  
 75 suitable plow and plow-beam, a plurality of supporting-wheels whereof one is a land-side wheel, a crank-axle upon which said land-side wheel is mounted, said crank-axle being composed of two sections, a segmental rack  
 80 rigid with one section, a coupling holding the two sections end to end, said coupling being rigid with one section and capable of turning or rotating upon the other section, a lever rigid with said coupling, and a locking device  
 85 carried by said lever and adapted to engage said rack, whereby the land-side wheel is capable of movement relatively to the plow.

15. In a wheeled plow, the combination of a suitable plow and plow-beam, a plurality of  
 90 supporting-wheels whereof one is a furrow-side wheel, a vertically-disposed spindle upon which said furrow-side wheel is mounted, a bearing rigidly connected with the plow-beam and adapted to slide up and down upon said  
 95 spindle, a swinging lever, a rock-shaft extending through an ear on said bearing, said rock-shaft being provided with two crank-arms, one of said crank-arms being connected with the upper end of said spindle, and a link  
 100 connecting the other crank-arm with the said lever, whereby the adjustment of said lever causes the said bearing to slide up or down upon said spindle, so as to raise or lower the forward portion of the plow-beam.  
 105

16. In a wheeled plow, the combination of a suitable plow and plow-beam, a plurality of  
 110 supporting-wheels whereof one is a furrow-side wheel, a vertically-disposed spindle upon which said furrow-side wheel is mounted, a bracket secured to said plow-beam, a bearing adjustably secured to said bracket and adapted to slide up and down upon said  
 115 spindle, a swinging lever, a rock-shaft extending through an ear on said bearing, said rock-shaft being provided with two crank-arms, one of said crank-arms being capable of adjustment along the said rock-shaft, a link or rod for connecting one of said crank-arms with the upper end of said spindle, and  
 120 a connecting-rod arranged to connect the other crank-arm with the said lever, the latter thereby being capable of raising and lowering the bearing upon the spindle, so as to raise and lower the forward portion of the  
 125 plow-beam, and the adjustable connection between the bearing and the said bracket permitting the line of travel of the furrow-side wheel to be changed at will.

17. In a wheeled plow, the combination of a 130



suitable plow and plow-beam, a plurality of supporting-wheels whereof one is a furrow-side wheel, a vertically-disposed rotary spindle having its lower end provided with a laterally-extending arm upon which the said furrow-side wheel is mounted, a bracket secured to said plow-beam, a bearing adjustably secured to said bracket and adapted to slide up and down upon said spindle, a swinging lever, a link and a cranked rock-shaft serving as medium of connection between the upper end of said spindle and the said bearing, and a link arranged to connect the cranked rock-shaft with the said lever, the adjustment of the lever thereby causing the bearing and the bracket and forward portion of the plow-beam to move up and down upon said spindle, and the adjustable connection between the bearing and the said bracket permitting the line of travel of the furrow-side wheel to be changed at will.

18. In a wheeled plow, the combination of a suitable plow and plow-beam, forward supporting-wheels having shifting connections with the plow-beam, a rear caster-wheel having a stem, a bearing in which said stem is free to turn, relatively short links connecting the lower portion of said bearing with the plow-beam, relatively long links connecting the upper portion of the bearing with the plow-beam, the difference in length of the upper and lower links causing the stem to incline rearwardly when the plow is lifted from the ground, a suitable tongue, a suitable connection between said tongue and said caster-wheel, whereby the latter is locked in alinement with the plow-beam when the machine is running straight ahead, regardless of whether the plow is up or down, the tongue when swung to one side automatically releasing the caster-wheel, so as to permit the latter to trail loosely.

19. In a wheeled plow, the combination of a suitable plow and plow-beam, forward supporting-wheels, a rear caster-wheel having a vertically-swinging connection with said plow-beam, the said swinging connection being such that the stem of the caster-wheel tilts or inclines rearwardly when the plow is raised from the ground, a suitable tongue, suitable connection between said tongue and said stem of the caster-wheel, the tongue holding the caster-wheel rigid when the machine is running straight ahead, whether the plow is up or down, a swinging lever, and suitable connections between said lever and said wheels, the lever thereby being operative to simultaneously control all of said wheels, so as to bodily raise and lower the plow.

20. In a wheeled plow, the combination of a suitable plow and plow-beam, forward supporting-wheels, a rear caster-wheel provided with a stem, a shifting connection between said stem and said plow-beam, the connection being such that the stem tilts or inclines to the

rear when the plow is raised from the ground, a suitable tongue, connections whereby the tongue holds the caster-wheel against lateral side swing while the machine is running straight ahead, the connections permitting the tongue when swung to one side to automatically release the caster-wheel, a swinging lever, and connections whereby the adjustment of the lever causes the plow to rise or fall.

21. In a wheeled plow, the combination of a suitable plow and plow-beam, a crank-axle journaled in a bearing on said plow-beam, a furrow-side wheel having a shifting connection with said plow-beam, a rear caster-wheel having a shifting connection with said plow-beam, a hand-lever rigidly secured to said crank-axle, a land-side wheel mounted upon said crank-axle, a pull-rod for connecting said lever with the rear caster-wheel, suitable connection between said lever and the said furrow-wheel, the said lever thereby being operative to simultaneously control all of said wheels, so as to raise and lower the plow, and a second lever for independently adjusting the land-side wheel.

22. In a wheeled plow, the combination of a suitable plow and plow-beam, a crank-axle journaled in a bearing on said plow-beam, a land-side wheel on said crank-axle, a lever rigidly secured to said crank-axle, a suitable furrow-side wheel, a rear caster-wheel having a shifting connection with the plow-beam, a pull-rod serving as medium of connection between said lever and said caster-wheel, the lever thereby being operative to simultaneously control both the caster and the land-side wheel, and a second lever for independently adjusting or controlling the land-side wheel.

23. In a wheeled plow, the combination of a suitable plow and plow-beam, a rear caster-wheel provided with a vertically-disposed stem, a suitable bearing in which said stem is free to turn, upper and lower links connecting said bearing with the plow-beam, a crank-axle journaled in the bearing on said plow-beam, a land-side wheel mounted on said crank-axle, a lever connected and arranged for adjusting the land-side wheel without turning the portion of the crank-axle which is mounted in said bearing on the plow-beam, a furrow-side wheel having a shifting connection with said plow-beam, and a second hand-lever connected and arranged for simultaneously controlling all of said wheels, so as to raise and lower the plow.

24. In a wheeled plow, the combination of a suitable plow and plow-beam and a plurality of supporting-wheels, a pivoted lever, a bell-crank arranged to raise the rear portion of the plow-beam, and a pull-rod serving as medium of connection between said lever and said bell-crank, the pull exerted by said rod operating to raise the plow.

25. In a wheeled plow, the combination of a



suitable plow and plow-beam and a plurality of supporting wheels, a crank-axle upon which one of said supporting-wheels is mounted, a vertically-disposed spindle upon which  
 5 one of said supporting-wheels is mounted, a lever which is rigidly secured to said crank-axle, a shifting connection between the plow-beam and said spindle, and a link and a crank-shaft for connecting said lever with said shifting  
 10 connection, the adjustment of the lever thereby causing the forward portion of the plow-beam to move up or down.

26. In a wheeled plow, the combination of a suitable plow and plow-beam, a crank-axle  
 15 journaled in a bearing on said plow-beam, a land-side wheel mounted on said crank-axle, a furrow-side wheel having a shifting connection with the plow-beam, a rear caster-wheel having a shifting connection with the  
 20 plow-beam, a lever rigidly secured to said crank-axle and provided with a downwardly-extending and relatively short arm, a pull-rod arranged to connect said relatively short and downwardly-extending lever-arm with  
 25 the rear caster-wheel, and a second lever for independently controlling or adjusting the land-side wheel.

27. A frameless high-lift sulky-plow, comprising furrow and land side wheels capable  
 30 of relative adjustment, a rear caster-wheel capable of relative shift or adjustment, a crank-axle upon which one of said wheels is mounted, a lever rigidly secured to said crank-axle, link connections between said hand-  
 35 lever and the other wheels, the said lever thereby being operative to simultaneously control all of said wheels, so as to raise and lower the plow.

28. In a wheeled plow, the combination of a  
 40 suitable plow and plow-beam, forward supporting-wheels, a rear supporting-wheel, a pivoted lever, said lever having a downwardly and rearwardly projecting arm, a connection between said arm and said rear supporting-  
 45 wheel, suitable connections between said lever and the forward supporting-wheels, the connections and relative arrangement being such that the plow-point is always below the heel when the plow is in the ground.

29. In a wheeled plow, the combination of a  
 50 suitable plow and plow-beam, supporting-wheels, a pivoted lever provided with a downwardly and rearwardly projecting arm, a link connecting said arm with one of said wheels,  
 55 suitable connection between the lever and the other supporting-wheels, the connections and relative arrangement being such that the plow-point is always below the heel when the plow is in the ground.

30. In a wheeled plow, the combination of a  
 60 suitable plow and plow-beam, a rear caster-wheel, a bell-crank serving as a medium of connection between said caster-wheel and said plow-beam, a crank-axle, a land-side  
 65 wheel mounted on said axle, a lever rigidly

secured to said axle, said lever being provided with a downwardly and rearwardly extending arm, a link for connecting said arm with said bell-crank, a furrow-side wheel having a shifting connection with said plow-  
 70 beam, suitable connections between said lever and said furrow-side wheel, said lever thereby being operative to simultaneously control all of said wheels, so as to raise or  
 75 lower the plow, and the connections and relative arrangement being such that the plow-point is always below the heel when the plow is in the ground.

31. A plow and beam, a front furrow-wheel, a rear caster-wheel, a land-side wheel, a hand-  
 80 lever connected and arranged for simultaneously controlling all of said wheels, so as to raise and lower the plow and maintain the plow-point below the heel while the plow is in the ground, and another lever for independ-  
 85 ently controlling the said land-side wheel.

32. A wheeled plow comprising a suitable plow and plow-beam, forward supporting-wheels, a rear caster-wheel, a pivoted lever  
 90 connected and operative to simultaneously control all of the wheels, so as to raise and lower the plow, the connections and relative arrangement being such that a throw of said lever beyond a certain point confines the ad-  
 95 justment or relative movement to the forward wheels.

33. A frameless high-lift sulky-plow, comprising a suitable plow and plow-beam, a rear  
 100 caster-wheel having a shifting connection with the rear upright portion of the plow-beam, land-side and furrow-side wheels having shifting connections with the horizontally-disposed portion of the plow-beam, a lever  
 105 connected and arranged for simultaneously operating all of said shifting connections, so as to cause a bodily rise and fall of said plow, and a second lever connected and arranged for operating the shifting connection between the plow-beam and land-side  
 110 wheel independently of the others.

34. A frameless high-lift sulky-plow, comprising a suitable plow and plow-beam, a rear  
 115 caster-wheel having a shifting connection with the plow-beam, a forward furrow-wheel having a shifting connection with the plow-beam, a crank-axle mounted in a bearing on said plow-beam, a lever suitably mounted upon said axle and connected for simultane-  
 120 ously rotating the latter and operating both of said shifting connections, a land-side wheel mounted upon said axle, and a second lever connected and arranged for controlling said land-side wheel independently of the other  
 125 wheels.

35. A wheeled plow comprising a plow and  
 125 plow-beam, land-side and furrow-side wheels having shifting connections with the plow-beam, a rear caster-wheel having a shifting connection with the plow-beam, a lever connected and arranged for simultaneously con-  
 130



trolling all three wheels, so as to raise and  
lower the plow, a driver's seat mounted on  
the caster-wheel, and a tongue connected and  
arranged to control the furrow-side and cas-  
5 ter wheels.

36. The combination of a plow and beam,  
a rear caster-wheel, a land-side wheel, a fur-  
row-side wheel, a tongue connected and ar-  
ranged to control the caster-wheel and fur-  
10 row-side wheel, a lever for simultaneously  
adjusting all three wheels, so as to raise and

lower the plow and beam, a driver's seat  
mounted on the caster-wheel, and a second  
lever for independently adjusting the land-  
side wheel.

Signed by me at Davenport, Scott county,  
Iowa, this 17th day of January, 1902. 15

SAMUEL H. TINSMAN.

Witnesses:

I. C. ANDERSON,  
A. B. FRENIER.