

(No Model.)

2 Sheets—Sheet 1.

E. E. WHIPPLE.
CULTIVATOR.

No. 314,767.

Patented Mar. 31, 1885.

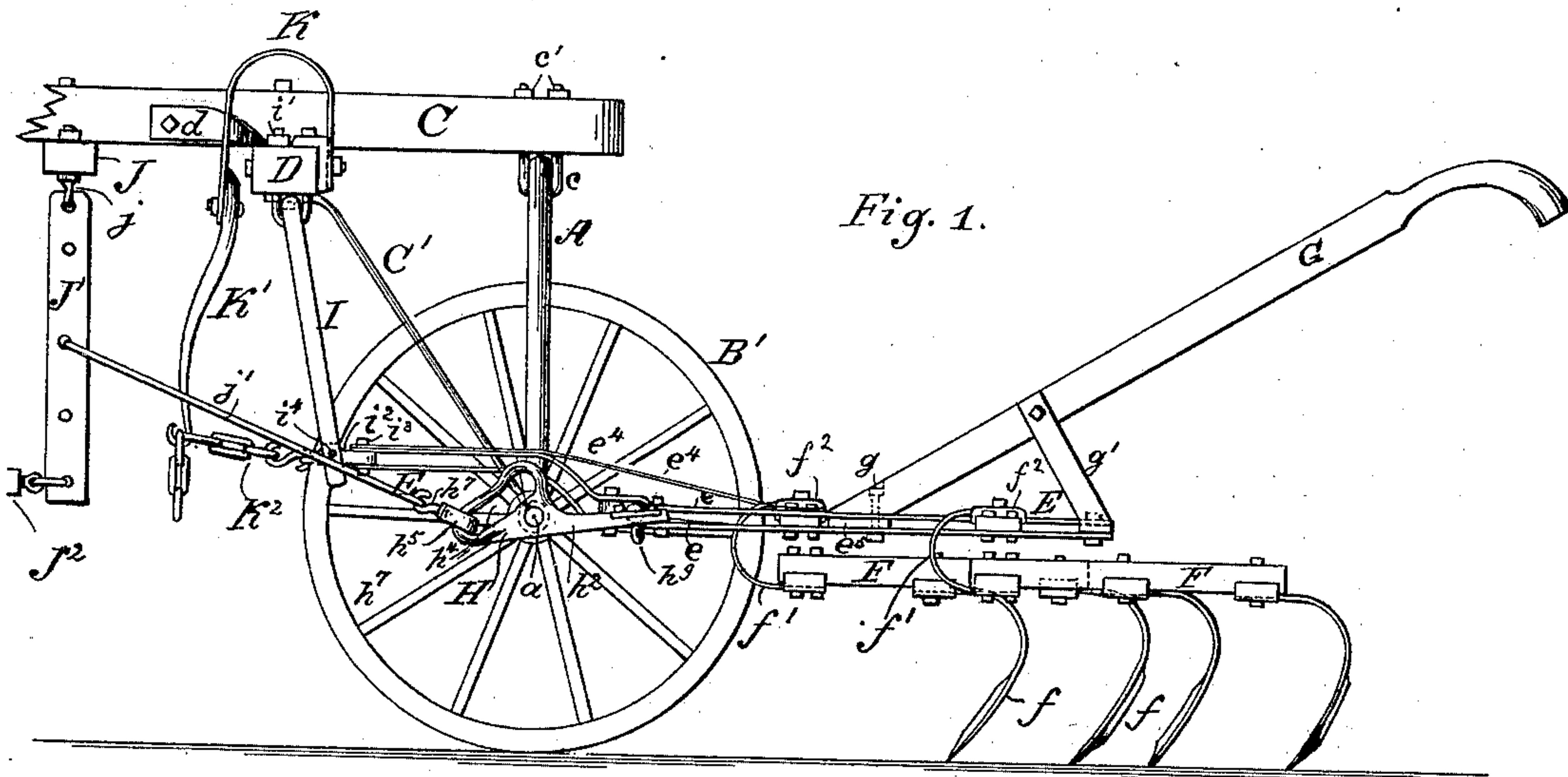


Fig. 1.

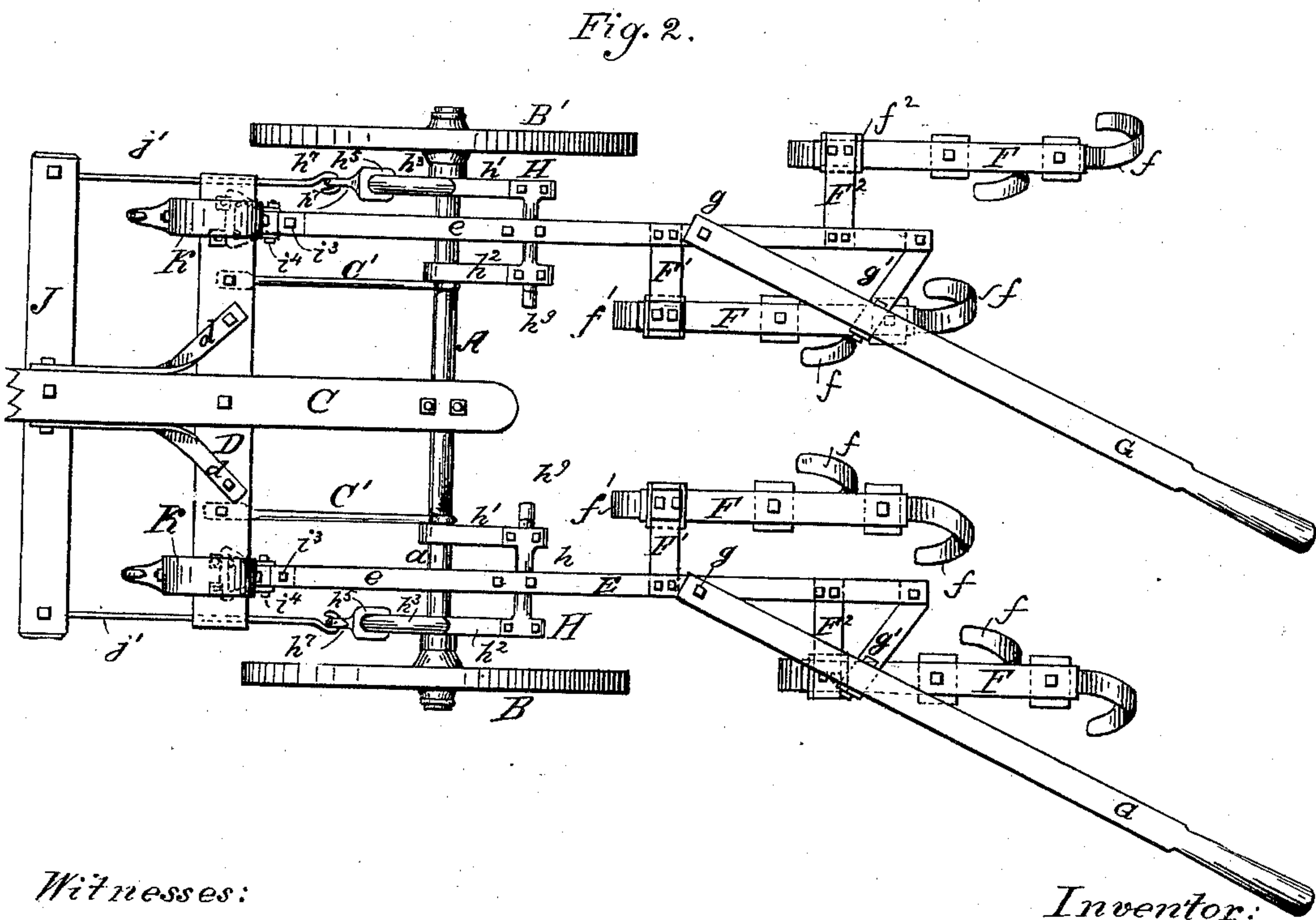


Fig. 2.

Witnesses:

G. Hugel.
C. C. Poole

Inventor:

Effinger E. Whipple.
By W. E. Dayton
Attorney.

(No Model.)

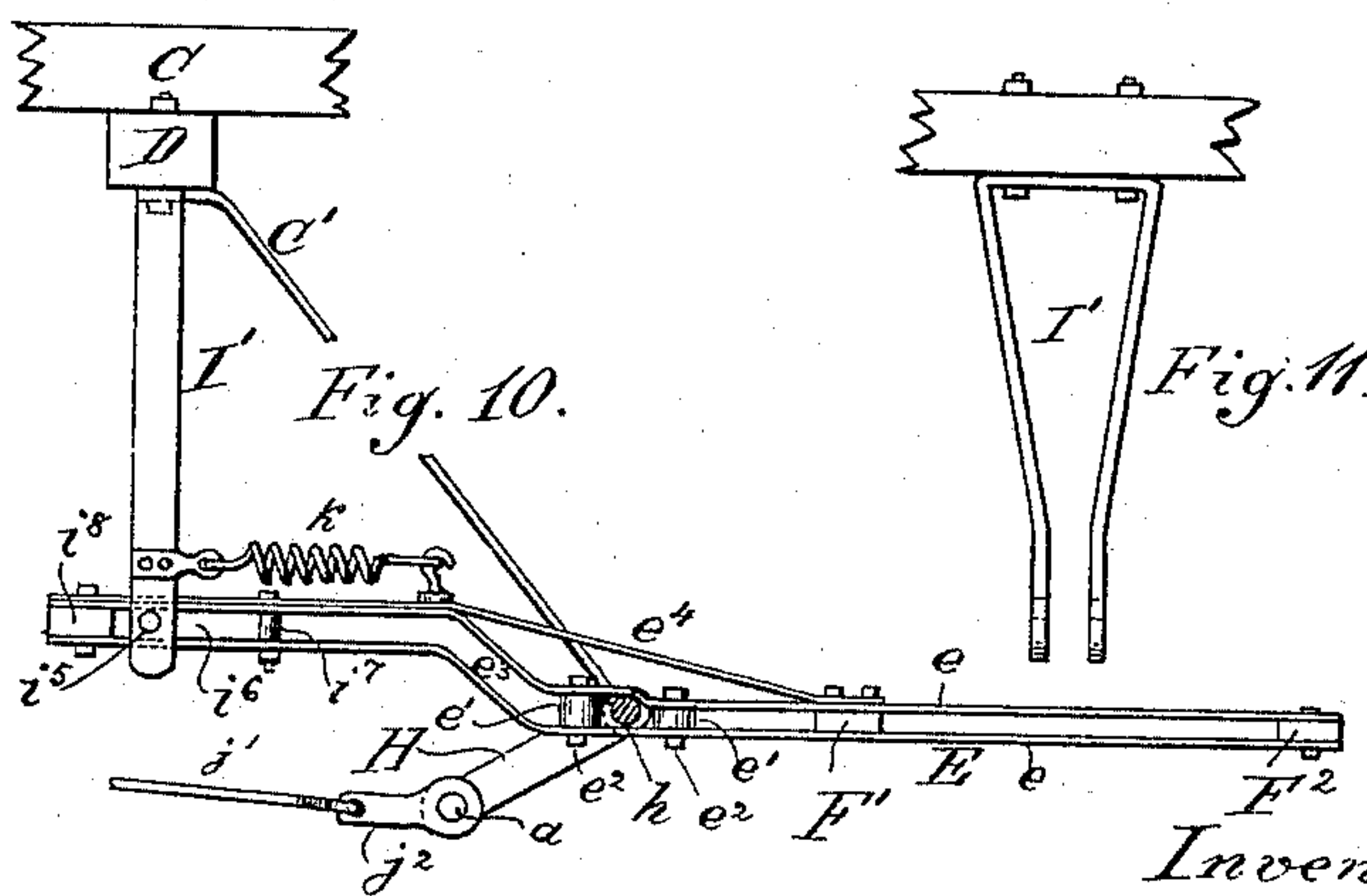
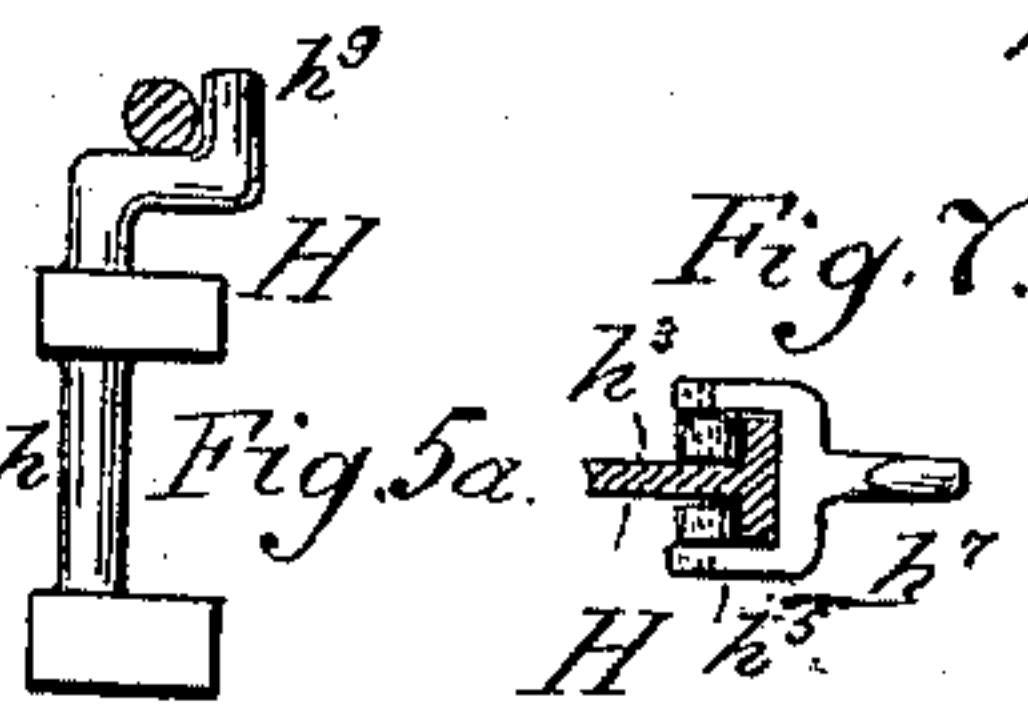
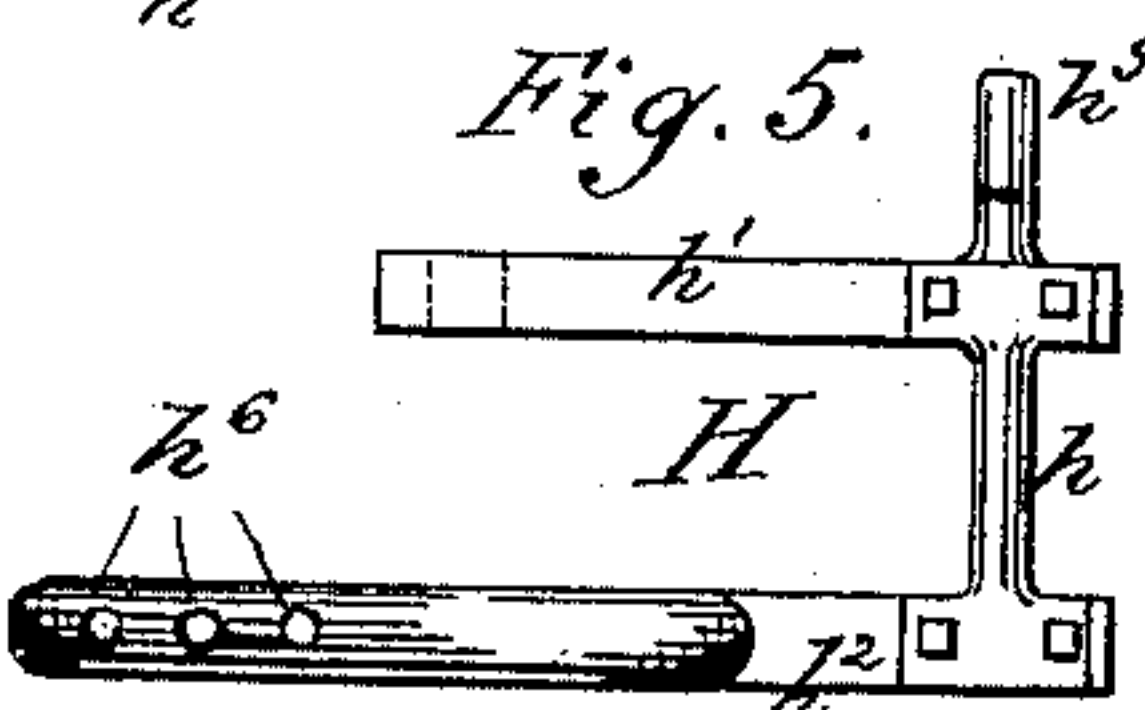
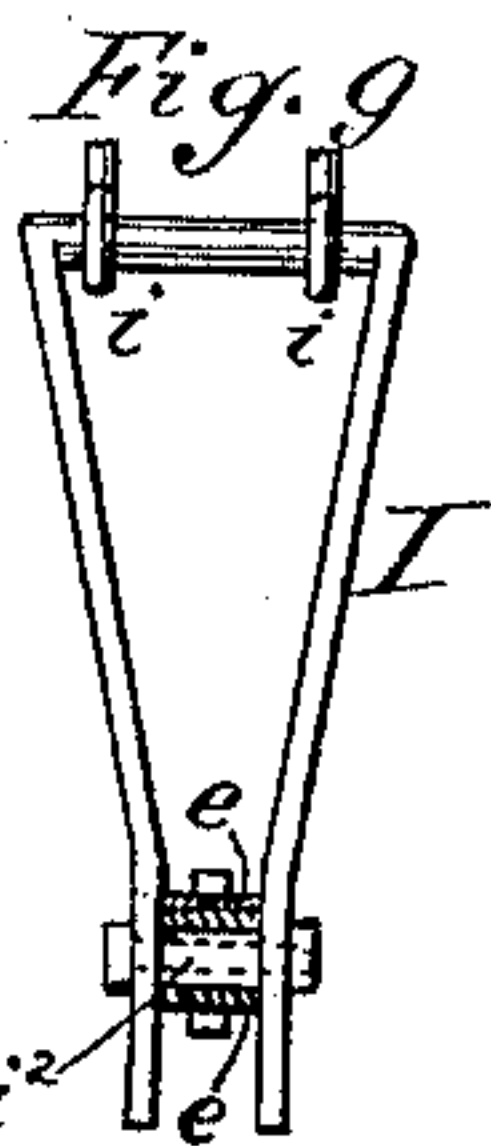
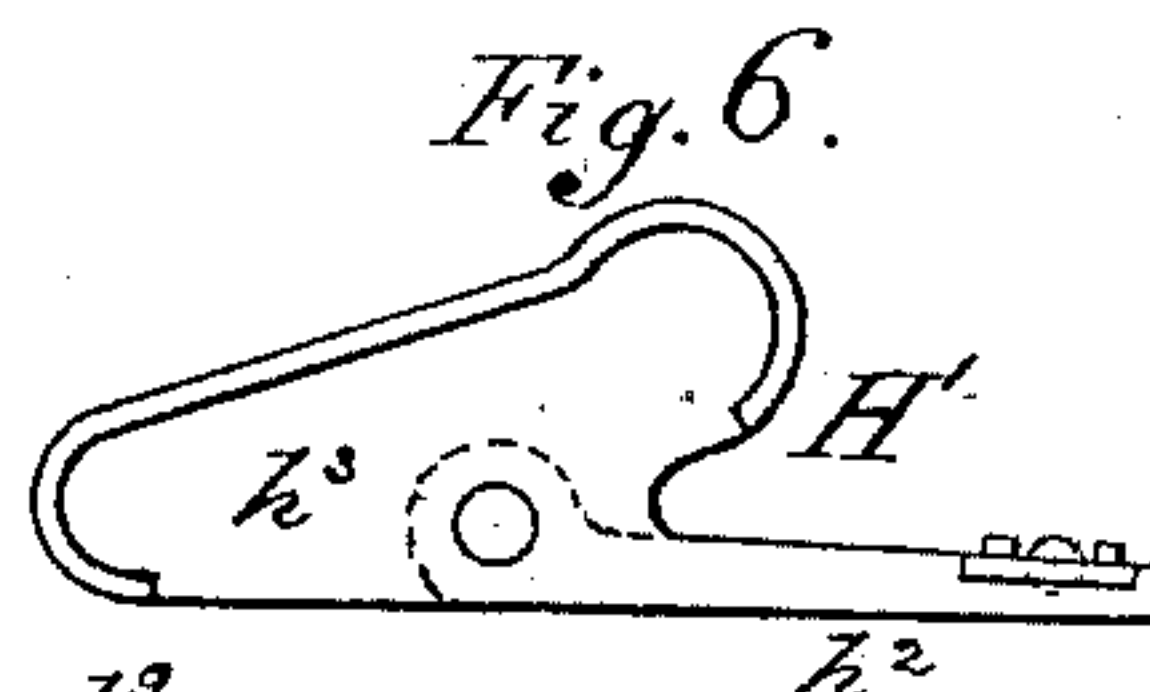
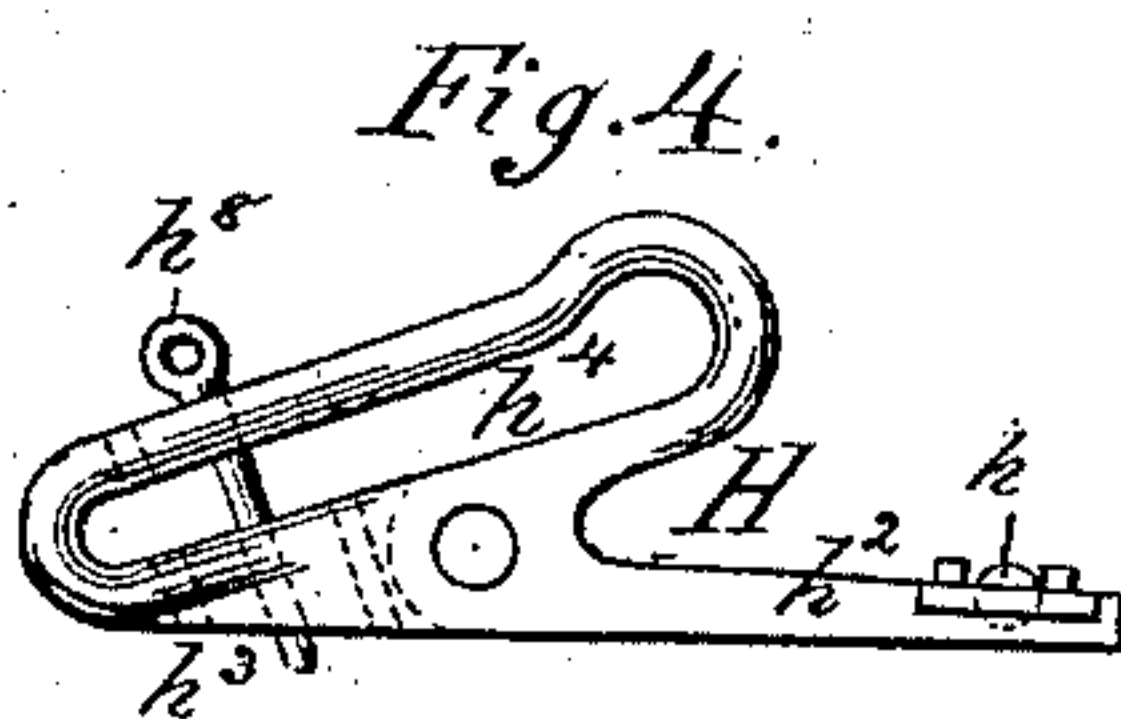
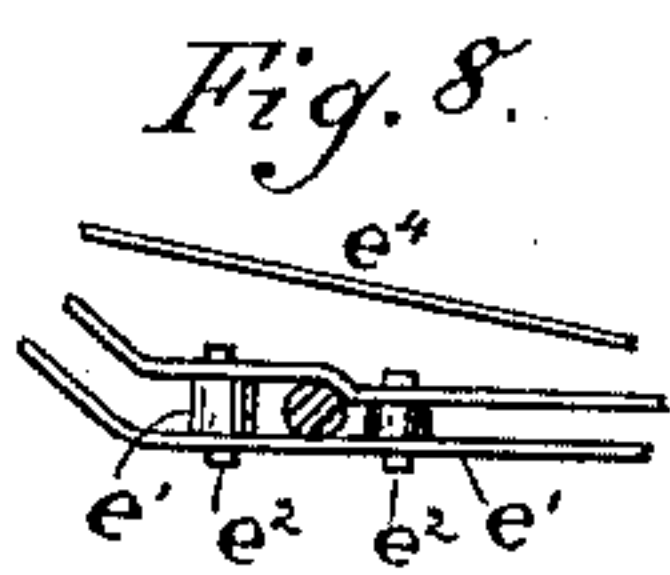
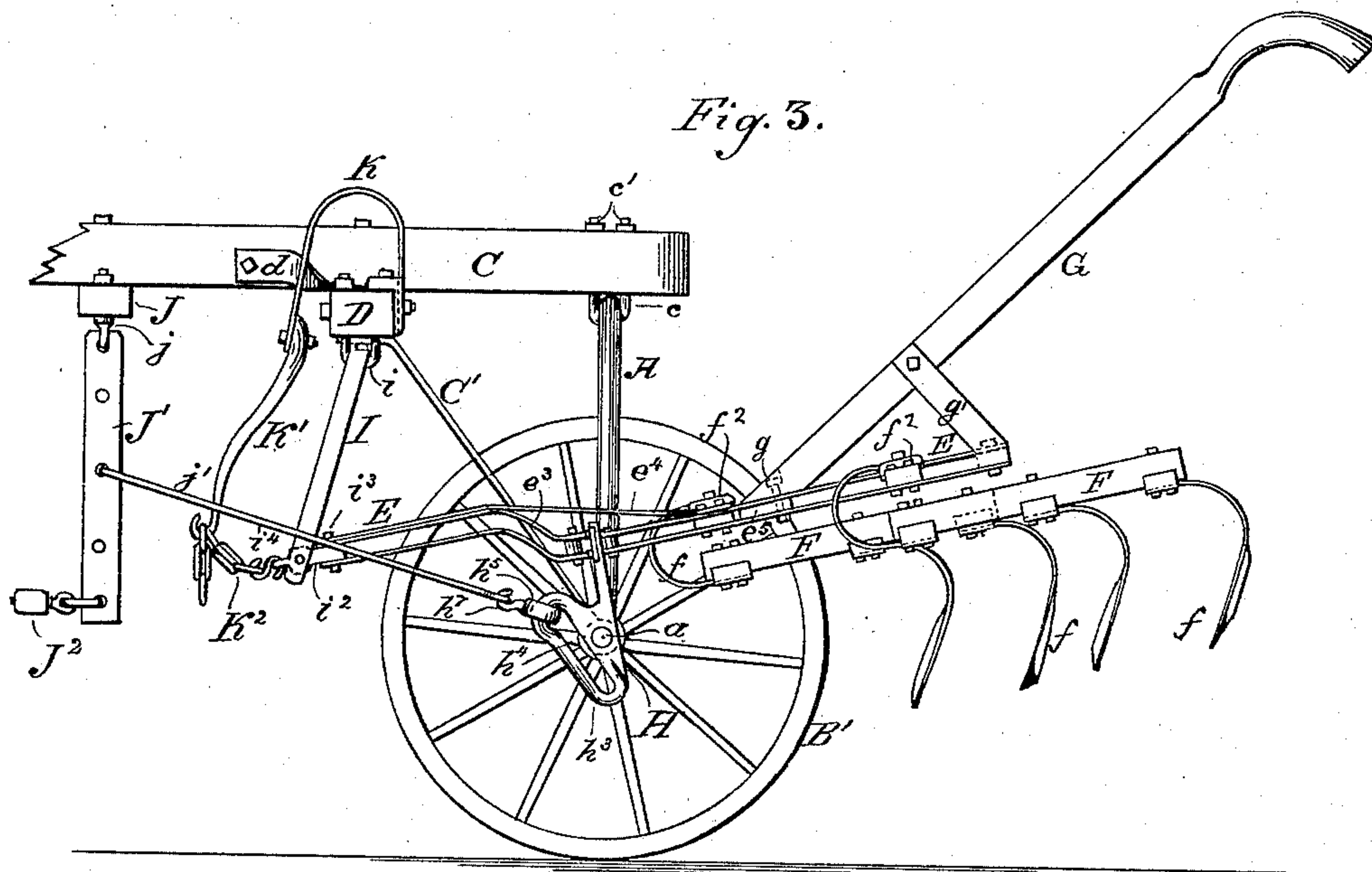
2 Sheets—Sheet 2.

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Witnesses:

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Inventor:

Effinger E. Whipple
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UNITED STATES PATENT OFFICE.

EFFINGER E. WHIPPLE, OF EATON RAPIDS, MICHIGAN.

CULTIVATOR.

SPECIFICATION forming part of Letters Patent No. 314,767, dated March 31, 1885.

Application filed August 13, 1884. (No model.)

To all whom it may concern:

Be it known that I, EFFINGER E. WHIPPLE, of Eaton Rapids, in the county of Eaton and State of Michigan, have invented certain new and useful Improvements in Cultivators; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The object of the present invention is to provide a construction in cultivators whereby the drag-bars thereof, with the parts attached thereto, may be easily raised by the operator, securely held in their elevated position without effort or attention on his part, and easily brought down to resume their work when desired, and also to improve the construction of cultivators in other particulars, as will be hereinafter set forth.

The present invention consists in the matters hereinafter described, and pointed out in the claims hereunto appended.

In the accompanying drawings, Figure 1 is a side elevation of a cultivator constructed according to and embodying the present invention, showing the drag-bars thrown down and the wheel removed from the side next the eye to more clearly show the construction of the parts. Fig. 2 is a plan of the same. Fig. 3 is a side elevation of the same, showing the drag-bars thrown up and one wheel removed, as in Fig. 1. Fig. 4 is a plan in detail of a link, bar, or arm by which the drag-bar is attached to the axle. Fig. 5 is a side elevation of the same. Fig. 5^a is an end view of the same. Fig. 6 is a side view of a modified form of the link or arm shown in Figs. 4 and 5. Fig. 7 is a partial section of the same. Fig. 8 is a side view in detail of a portion of the drag-bar, showing its connection with the link or arm. Fig. 9 is a rear view in detail of the link or depending arm that connects the front end of the drag-bar with the frame. Fig. 10 is a side view of the drag-bar, showing a modified form of devices connecting its front end with the machine-frame. Fig. 11 is a detail showing an arm or bracket used in the construction shown in Fig. 10. Fig. 12 is a top view in detail of the swivel-piece that connects the front end of the drag-bar with the link shown in Fig. 9. Fig. 13 is a top view

in detail of a hook and anti-friction roller used to connect the draft devices with the link of Fig. 4.

The cultivator herein shown belongs to that class known as "straddle-row" wheeled cultivators, and is provided with an arched axle, A, wheels B B', and a tongue or pole, C, secured to the top of the arched portion of the axle by a bolt, *c*, the ends of which pass through the pole and are held by nuts *c'*. Upon the said pole, forward of the axle, is secured a cross-beam, D, which is connected near its ends with the axle by means of brace-rods C' C', which encircle the lower horizontal portion of the axle, and are bolted to the said cross-beam, so as to give a desired rigid connection between the tongue and the axle. The cross-piece D is herein shown as bolted to the tongue and additionally secured thereto by diagonal braces *d d*.

The parts above mentioned form the frame of the machine, to which the several operative parts are attached.

E E are drag-bars to which the tooth-bars F F, provided with flexible and oppositely curved and twisted teeth *f*, are attached by means of springs *f' f'*, the construction shown in the said tooth-bars and the teeth thereon being substantially similar to that set forth in a patent heretofore granted to me. The handles G G are also bolted to the drag-bars at *g* and further secured by braces *g'*.

The drag-bars are preferably constructed of two parallel horizontal flat bars, *e e*, of iron, and held apart by spacing-pieces inserted between them, and secured by bolts, as hereinafter more particularly described. The drag-bars are, as shown, supported at their rear ends from the axle A by means of arms H, which are pivotally connected both with the axles and drag-bars so as to allow the rear ends of the latter a free upward and forward movement; and said drag-bars are connected at their forward ends with the machine-frame by pivotal connections, permitting both a lateral and vertical movement of the rear ends of the bars, and also a bodily longitudinal movement thereof.

The connection for the forward ends of the drag-bars shown in Figs. 1, 2, and 3 consists of depending arms or links I, which are pivotally connected at their upper and lower

ends with the beam D and the drag-bars, respectively.

The arms H are, as herein shown, constructed to encircle the axle so as to rotate freely thereon, and preferably consist of two parallel parts, $h' h^2$, connected at their outer ends by rods h , which are parallel with the axle, and as usually constructed are bolted to said arms at their ends, as shown. The said rods h may, of course, be made in one piece with the parts $h' h^2$, or otherwise, with the same result as in the construction illustrated.

The drag-bars, as before stated, are pivoted to the frame in such manner as to permit both a lateral and a vertical movement of their rear ends, and the parts $h' h^2$ of the arms H are preferably placed at some distance apart, and the rods h are made of considerable length in order to allow the drag-bars to slide upon the latter when their rear ends are moved laterally. In the operation of the machine, the said rods being inserted through apertures or slots in the drag-bars, which slots are made of sufficient length to permit the rod to move longitudinally of the drag-bars when the latter are swung laterally, as above mentioned.

In the particular construction herein shown, in which the drag-bars consist of two flat bars, $e e$, the rods h are inserted between the bars and held from moving longitudinally with reference thereto by means of studs or thimbles $e' e'$, located between the bars $e e$, and held in place by bolts $e^2 e^2$, inserted through the said thimbles and bars.

The links or arms I are, as herein shown, made of inverted-U shape, and are pivoted to the beam D by the hook-shaped bolts i , which prevent lateral motion of the link, but permit their lower ends to swing freely in a longitudinal direction with relation to the frame. The drag-bars are connected with the free ends of the said links I by universal joints formed by swivel-pieces i^2 , which swing freely upon vertical bolts i^3 , uniting them with the forward ends of the drag-bars and upon horizontal pins or bolts i^4 , which pass through the said swivel-pieces and the lower ends of the bars composing the said links. If preferred, the connection of the drag-bar with the frame of the machine may be made by means of arms I' , depending from the beam D and rigidly secured thereto, as shown in Fig. 11, and a bolt, i^5 , which passes through longitudinal slot i^6 in the forward end of the drag-bar, and is fastened in the ends of the said arms. The space between the lower ends of the arms is somewhat greater than the width of the drag-bar, so as to allow the latter to turn in a horizontal plane in the operation of the machine, the desired longitudinal movement of the drag-bars being permitted by the movement of the bolt i^5 in the slot i^6 . The said slot i^6 is, as shown in Fig. 10, formed between the forward ends of the two bars $e e$, comprising the drag-bar, a stud, i^7 , connecting the said bars, and a block, i^8 , secured between the said bars at their forward ends.

Either of the devices above described for connecting the front end of the drag-bar with the frame will obviously operate to hold the said front end from movement vertically and laterally, and will allow the desired longitudinal movement thereof with reference to the frame. The construction first described is, however, for several reasons, preferred.

By means of the devices described it is obvious that the rear ends of the drag-bars may be readily raised, the arms H in such operation turning upon the axle while the pivot-rod h is moving upward and forward until it has passed over the axle, when further forward movement of the bar is limited by means of a suitable stop acting upon the arm or drag-bar, and operating in connection with the said arm to sustain the rear end of the drag-bar in an elevated position. The said stop, as shown in Figs. 1, 2, 3, 5, and 5^a, is formed by a short rearwardly-bent arm, h^9 , upon the arm H, constructed to encounter the vertical portion of the axle-arch, and, as shown in Fig. 10, is formed by the stud i^7 , which limits the forward movement of the drag-bar by encountering the bolt i^5 .

The drag-bar is obviously held in its elevated position by its weight acting upon the pivot-rod h when the latter is in advance of the axle, and said drag-bar may be readily thrown downward into operative position by drawing it backward until the said pivot-rod is at the rear of the axle, when the bar will descend by its own weight.

As shown in Figs. 1, 2, and 3, curved or C springs K are attached to the beam D and connected with the drag-bars by depending arms K' and chains K^2 , the latter being herein shown as attached to the swivel-pieces i^2 at the forward ends of the drag-bars. The said springs are constructed to maintain a constant forward strain on the drag-bars when the latter are in operative position, and to thereby assist in throwing said drag-bars upward when it is desired to carry the teeth free from the ground.

When a rigid arm, I' , is used instead of the arm I shown in the figures above mentioned, a spiral spring, k , as shown in Fig. 10, may be employed instead of the flat spring K, one end of the said spring k being fastened to the drag-bar and the other to the rigid arm, as shown in Fig. 10. Other forms of spring-connections between the frame of the machine and the drag-bar adapted to produce a forward strain upon the drag-bars when the latter are to be thrown up or down may obviously be used with the same results as above described, and my invention, therefore, is not limited to any particular kind of springs for the purpose mentioned.

The draft-gear in the machine shown preferably consists of a double-tree or evener, J, which is pivoted to the tongue C in front of the beam D, and is provided at its ends with two depending loosely-hung bars, J' , secured to the evener by eyebolts j and single-trees J^2 ,

secured to the lower ends of the bars J'. Draft-rods j' are used to connect the bars J' with the wheel-axles, said rods being provided with hooked ends constructed to enter one of a series of holes in the said bars, so that the rods may be adjusted vertically on the bars. The bars J' are also preferably provided with two or more holes at their lower ends, so that the points of attachment of the single-trees thereto may be changed when desired.

As a preferred construction in the devices for attaching the draft-gear in the machine constructed as above described, such devices are made as follows: The arm H has a projecting part or arm, h^3 , extending out from the axle A in a direction opposite to that of the arm h^2 and attached, as herein shown, to the part h^1 of said arm. The arm h^3 has a slot, h^4 , formed in it, by means of which the draft-gear is connected with the axle. The position and direction of the slot h^4 is such that a hook, link, or, as herein shown, an anti-friction pulley, h^5 , to which the draft-rod j' is attached, will be drawn toward the outer end of the slot by the action of the draft when the drag-bar is in operative position, and the draft will, through this construction, produce a downward pressure on the drag-bars, so as to force the cultivator-teeth into the ground, this downward pressure obviously being greater in proportion to the distance of the pulley h^5 from the axle. The pulley h^5 may be prevented from moving out to the end of the slot h^4 when the full pressure downward on the teeth is not required by a bolt or stop-pin, h^8 , inserted in one of the holes, h^6 , in the arm h^3 , as shown in Figs. 5 and 6. When the drag-bars are thrown up to carry the teeth free from the ground, and the arm H swings upward around the axle A, the pulley h^5 is caused to slide to the inner or upper end of the slot h^4 by the action of the draft, and said slot being, as shown, extended so that its upper end is above the axle when the parts are in the position mentioned, the action of the draft will, when the arm H is in its elevated position, keep it there, and thus prevent the teeth from resuming their operative position.

Instead of the slot h^4 , a T-shaped rib may be formed on the arm h^3 , and the hook or link h^1 may be furnished with two pulleys to run on the inner surface of the head of the T, as is clearly shown in Figs. 6 and 7; but the construction first described is preferred.

The particular draft-connections described are obviously not necessary to the successful operation of the machine constructed in other respects as above set forth, and the arm h^3 may therefore be dispensed with and the draft-rod connected with the axle by means of a pivoted connecting-piece, j^2 , as shown in Fig. 10.

By means of the vertical adjustment of the forward ends of the draft-rods upon the bars J' the direction of the draft with relation to the arm H and axle A may obviously be changed, whereby the degree of downward pressure exerted on the teeth by the action of

the draft when the drag-bar is in operative position may be increased or diminished as desired. The drag-bar is, as herein shown, bent at e^3 to allow the pivot-rod to descend to a position horizontally in the rear of that of the axle on which the arm H swings, and a brace or strengthening piece, e^4 , is bolted to the forward end of the drag-bars, extends over the bent portion, and is secured at its rear end by the bolts which fasten the cross-pieces F' to the drag-bars.

In the construction shown the bars or plates e , comprising the drag-bars, are connected so as to give the desired rigidity to the drag-bars by means of the parts inserted between the said plates, consisting of the swivel-pieces e^2 , the thimbles $e' e'$, the ends of the cross-bars F' F', and the ends of the braces g' , and the several bolts passing through the parts mentioned for securing them to the bars. The springs f' are, as shown, attached to the cross-pieces F' F' by means of plates f^2 , recessed upon their upper and lower faces to receive the ends of the cross-pieces and springs and bolts passing through the several parts mentioned.

Inasmuch as the draft-rod j' may be connected with the arm h^3 of the arm H otherwise than by a sliding connection, as herein shown, with the same novel result of forcing the rear end of the drag-bar downwardly by the action of the draft upon said arm h^3 , my invention, as it relates to the parts mentioned, is not limited to such sliding connection between the draft-rod and the arm. A construction of the parts may be used, for instance, in which the arm h^3 is provided with an eye at its lower end, into which the draft-rod is hooked, a second eye or aperture, in case such construction is used, being preferably located upon the said arm in position corresponding with the inner or upper end of the slot h^4 , into which the draft-rod may be hooked when the drag-bar is raised, in order to prevent the forward pull of the draft-rod upon the arm h^3 from throwing the arm H backwardly, and thus causing said drag-bar to fall.

A principal feature of improvement in the machine herein set forth is that wherein the drag-bar is pivoted to the machine-frame at its front end by devices permitting both a lateral and vertical movement of its rear end, and a crank-arm pivoted to the frame and having laterally-sliding connections with the bar is adapted to operate upon the latter at the rear of its pivotal point. The improved result due to this feature of construction arises from the fact that the force for lifting and depressing the drag-bar is applied to the latter at its rear portion, whereby a much greater effect is produced by the spring or draft in lifting the bar or in thrusting the teeth into the ground than when the devices for lifting and depressing the bar are applied at its point of pivotal connection.

As far as the feature of operation above mentioned is concerned, it is obvious that the

same effect may be produced when the drag-bar is pivoted to a part of the frame other than the axle, and when the connecting devices, instead of permitting bodily longitudinal movement in the drag-bar with reference to the pivotal axis of the crank-arms, are adapted to permit a lateral and vertical movement in the rear end only, and the free end of the crank-arm is connected with the drag-bar by means adapted to permit the crank-pin to move both longitudinally and laterally with reference to the said drag-bar, as is illustrated, for instance, in the machine shown in an application filed by me upon the 18th day of October, 1884, in which the same general features of construction above mentioned are present.

The important function of the spring, which, as herein shown, operates to draw the drag-bar forward is by its action upon the crank-arm to assist the latter in lifting the drag-bar. The same result may obviously be accomplished by a construction of the parts in which the spring is connected directly with the crank-arm, as is shown in the machine described in the patent above referred to, instead of operating through the medium of the longitudinally-movable drag-bar, as herein shown.

An important advantage is gained by the construction in which the drag-bars are longitudinally movable and are pivoted upon the axle, as herein shown, for the reason that when the drag-bars are supported in this manner and are thrown upwardly and forwardly, their center of gravity is moved forward with reference to the axle so as to bring a preponderance of weight forward of the axle, and thereby prevent any tendency of the machine to tip over backwardly when the teeth are raised from the ground.

Inasmuch as the several general features of improvement above stated may be applied equally well to cultivators other than straddle-row, such as herein shown, the appended claims are intended to cover said features of improvement as applied to any form of machine in connection with which they are capable of use.

I claim as my invention—

1. The combination, with the frame of a cultivator, of a drag-bar pivotally connected at its forward end with said frame by devices permitting both a horizontal and vertical movement of its rear end, a crank-arm pivoted to the machine-frame and engaged with the drag-bar by a sliding connection adapted to permit the drag-bar to move laterally upon the crank-arm, and means, substantially as described, for actuating said crank-arm, whereby the drag-bar may be raised or lowered, substantially as and for the purpose set forth.

2. The combination, with the axle and frame of a cultivator, of a drag-bar pivoted at its forward end to said frame by connections permitting a longitudinal movement of the drag-bar with reference to the frame, and an arm pivotally connected with the axle or a part of the frame and with the drag-bar, and adapted

to sustain the rear end of said drag-bar in its raised position when the latter is at the forward limit of its movement, substantially as described.

3. The combination, with the axle and frame of a cultivator, of a drag-bar pivoted at its forward end to said frame by connections permitting a longitudinal movement of the drag-bar with reference to the frame, an arm pivotally connected with the axle or with a part of the frame and with the drag-bar, and a spring applied between the frame and the drag-bar and arranged to throw the latter forward, substantially as and for the purpose set forth.

4. The combination, with the axle and frame of a cultivator, of a drag-bar pivoted to said frame at a point forward of the axle by connections permitting a longitudinal movement of the drag-bar with reference to the frame, and an arm pivotally connected with the axle and with the drag-bar, and arranged to project rearwardly from the axle when the drag-bar is in operative position, said arm being provided with a downwardly-projecting part adapted for the attachment of the draft-connections, substantially as and for the purpose set forth.

5. The combination, with the axle, frame, and drag-bar of a cultivator, of a vertically-arranged support for the front end of the said drag-bar pivotally connected at its upper end with the machine-frame and at its lower end with the drag-bar, an arm pivotally connected with the axle and with the drag-bar for sustaining the rear end of the latter, and a stop to limit the forward rotary movement of the said arm upon the axle, substantially as and for the purpose set forth.

6. The combination, with the axle and frame of a cultivator, of drag-bars pivotally connected with the frame at a point in advance of the axle, arms pivotally connected with the axle and drag-bars and provided with downwardly-projecting parts adapted for the attachment of draft-connections, an evener or double-tree pivoted to an elevated part of the machine-frame, depending bars pivotally connected with the ends of the evener and adapted for the attachment of suitable single-trees, and draft-rods connecting the said depending bars with the projections upon the said arms, substantially as and for the purpose set forth.

7. The combination, with the frame and axle of a cultivator, of drag-bars pivoted to the frame at a point forward of the axle by devices permitting a longitudinal movement of the drag-bar with reference to the frame, an arm pivotally connected with the axle and with the drag-bar, and provided with a downwardly-extending part or projection for the attachment of draft-connections, and a sliding attachment between said draft-connections and the said projection whereby the point at which the draft is applied may be automatically shifted when the arm is moved, substantially as and for the purpose set forth.

8. The combination, with the frame and axle

of a cultivator, of a drag-bar pivoted to the frame at a point forward of the axle by devices permitting a longitudinal movement of the drag-bar, an arm pivotally connected with the axle and with the drag-bar, and provided with a downwardly-extending part or projection, draft-rods having sliding connection with the said downwardly-projecting part of the said arm, and a stop or pin, as h^8 , adjustably secured to the arm for limiting the downward movement of the said draft-rods, substantially as and for the purpose set forth.

9. The combination, with the frame and axle of a cultivator, of drag-bars pivotally connected with the frame at points in advance of the axle, arms pivotally connected with the axle and drag-bars and provided with downwardly-projecting parts, an evener or double-tree pivoted to an elevated part of the frame, depending bars pivotally connected with the evener, and draft-rods attached to the downwardly-projecting parts of the said arms and adjustably connected with the said depending bars, substantially as and for the purpose set forth.

10. The combination, with the axle, frame, and drag-bars of a cultivator, of an arm pivotally connected with the axle and drag-bar for sustaining the rear end of the latter in a raised position, a link, I , for supporting the forward end of the drag-bar pivoted to an elevated part of the frame, and a swivel-piece, i^2 , pivotally connected with the link I and with

the drag-bar, whereby the latter may swing both in horizontal and vertical planes, substantially as and for the purpose set forth.

11. The combination, with the axle and frame of a cultivator, and a drag-bar pivoted to said frame by devices permitting both a lateral and vertical movement of its rear end, of an arm comprising two laterally-separated parts, h' h^2 , pivotally connected with the axle and provided with a pivot-rod, h , at their outer ends adapted to engage the drag-bar, whereby the latter may slide upon the said pivot-rod when its rear end is moved laterally, substantially as and for the purpose set forth.

12. The combination, with the axle and frame of a cultivator, of a drag-bar pivoted to the frame at a point in advance of the axle by devices permitting a longitudinal movement of the drag-bar, an arm pivotally connected with the axle and with the drag-bar, and provided with a downwardly-extending part, h^3 , provided with a slot, h^4 , extending above the axle, and a draft-rod, j' , having a hook or link engaged with the said slot, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

EFFINGER E. WHIPPLE.

Witnesses:

ALANSON OSBORN,
F. H. DEGOLIA.