G. Ray,

Potato Digger,

No. 57,568, Patented Aug. 28, 1866.

Fig. 1

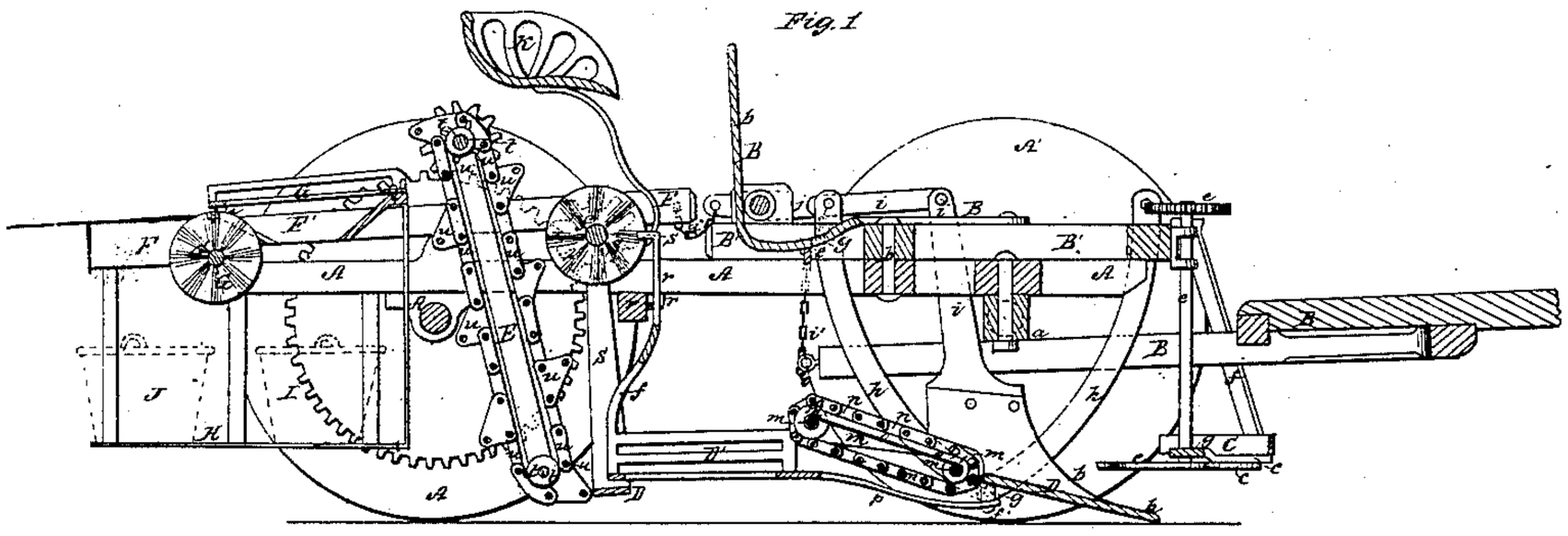


Fig. 2.

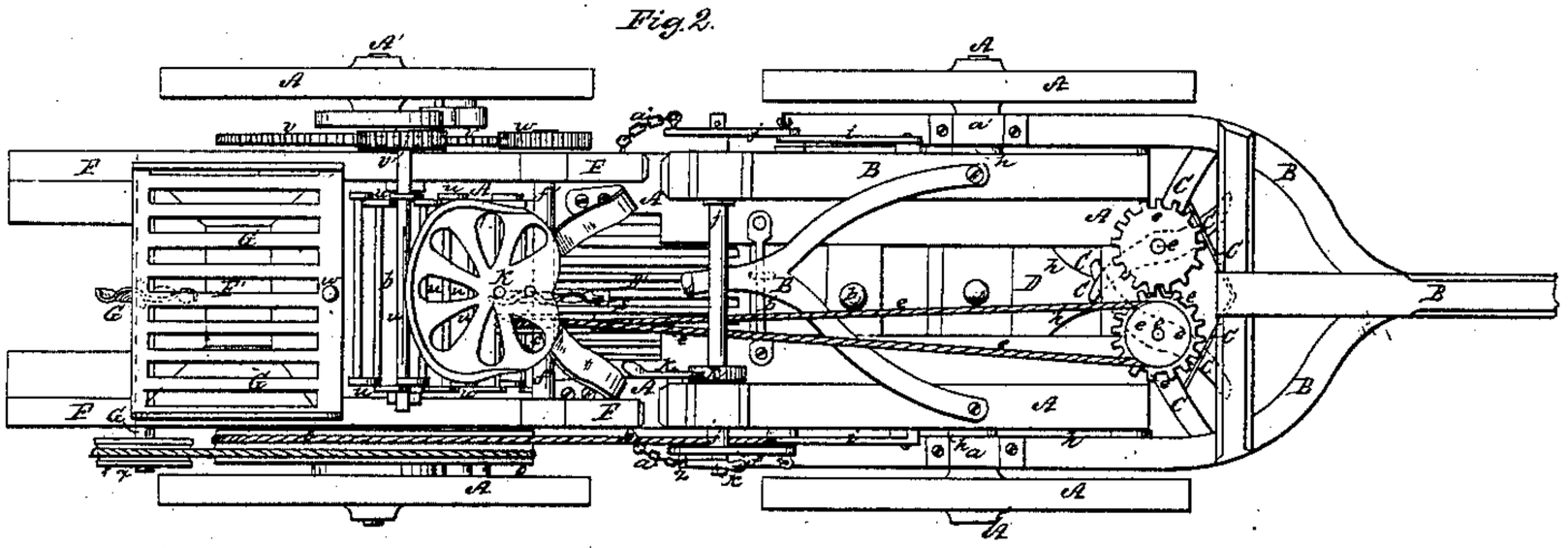
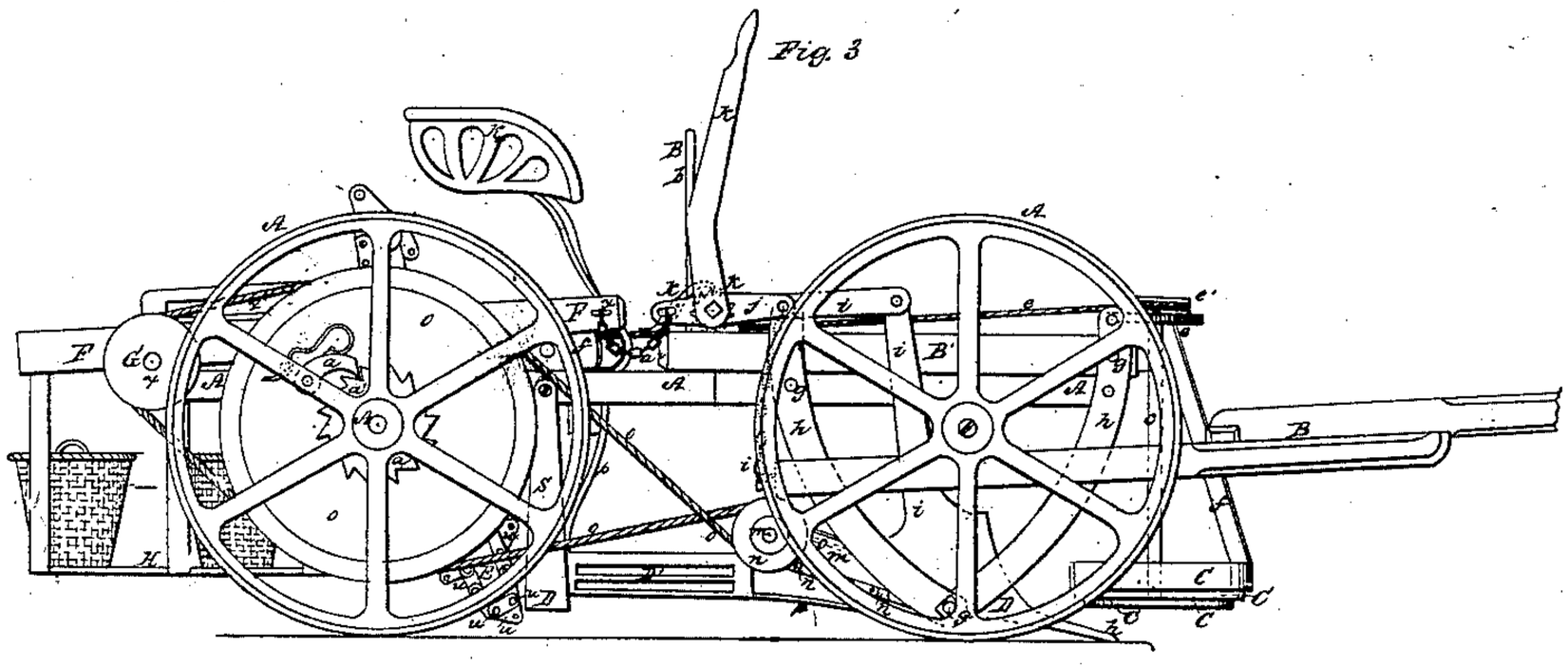


Fig. 3



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UNITED STATES PATENT OFFICE.

GEORGE RAY, OF KINDERHOOK, NEW YORK.

IMPROVEMENT IN POTATO-DIGGERS.

Specification forming part of Letters Patent No. **57,568**, dated August 28, 1866.

To all whom it may concern:

Be it known that I, GEORGE RAY, of Kinderhook, in the county of Columbia and State of New York, have invented certain new and useful Improvements in Potato-Diggers; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a central vertical longitudinal section of a potato-digger constructed according to my invention. Fig. 2 is a plan or top view of the same. Fig. 3 is a side elevation of the same.

Similar letters of reference indicate corresponding parts in all the figures.

This invention consists in a novel construction of a potato-digger, whereby the potatoes may be dug from the earth and separated from the soil with which they are intermingled much more thoroughly and effectually than by those heretofore in use, and whereby potatoes of different sizes are separated from each other and deposited in baskets or other suitable receptacles borne upon the machine, thus not only sorting the large from the small tubers, but also obviating the necessity of picking them up from the ground by hand, as has been required with the potato-diggers heretofore devised.

To enable others to understand the construction and operation of my invention, I will proceed to describe it with reference to the drawings.

A represents a horizontal frame, of wood or other suitable material, which sustains the working parts of the machine, and is itself supported by transverse axles A′, one of which is situated near each end of the aforesaid frame. These axles are furnished with supporting-wheels A*, of suitable size, the wheels upon the forward axle being loose thereon, while those upon the rearmost axle are provided with spring-pawls *a*, which act upon ratchet-wheels *a′*, secured upon the said rear axle at the inner side of the wheels A* in such manner that as the machine is drawn forward the rotation of the said wheels A* rotates the said rear axle in order to operate the various working or moving parts of the apparatus, as will be hereinafter fully set forth, at the same time that by turning the pawls *a* out of contact with the ratchet-wheels *a′*, the aforesaid rearmost wheels, A*, will be allowed to turn loosely upon their axle, as required in drawing the machine from place to place when not in operation.

B indicates the tongue or draft-pole by which the machine is drawn, and the forked rearmost end of which is pivoted to the foremost axle, A′, as shown at *a**.

B′ is a rectangular horizontal frame, much shorter than the frame A, upon the forward portion of which it is placed, the said frame B′ being pivoted near its center to the said frame A by means of a vertical pin or pivot, *b*. A limited horizontal movement around the pivot *b* may be communicated to the frame B′ through the agency of a lever, B*, the end of which is turned upward into a vertical position, as shown at *b′*, while its horizontal portion is made somewhat elastic, and is furnished with a downwardly-projecting spur, *c*, which fits into a notch formed in the upper edge of a transverse bar, *b**, secured upon the frame A, in order to retain the frame B′ in a position parallel with that of the frame A when required.

Working in suitable bearings fixed upon the forward end of the frame B′ are two vertical shafts, *c**, upon the upper ends of which are secured two horizontal gear-wheels, *e*, of equal size, which gear into each other and receive a rotary motion from a pulley, *e′*, attached to one of the shafts *c** above the gear-wheel *e* thereof, and which is operated by a cross-belt, *e**, extending from a vertical pulley, *f*, secured upon a transverse shaft, *f′*, situated at the central part of the frame A. Attached to the lower end of each of the shafts *c** are two horizontal curved blades or cutters, C.

C′ represents two cutters, situated somewhat in advance of the lower extremities of the vertical shafts *c**, and which are stationary with reference to the other portions of the machine, and are designed to act as shear-edges for the rotating cutters C to cut against in cutting off the potato-tops, as will be hereinafter more fully set forth. These cutters C′ are inclined at an angle toward each other, as shown more clearly in Fig. 2, and are supported by rods or bars *f**, which extend downward from the frame B′; and, furthermore, their inner ends

are connected by a straight intermediate portion, *g*, which not only serves to connect and strengthen the said inner ends of the cutters C′, but also furnishes bearings which steady the lower extremities of the shafts *c**. Attached to the upper side of the stationary cutters C′ is a narrow vertical guard, C*, the two sides of which slope back toward the sides and rear of the machine, as shown in the aforesaid Fig. 2.

Projecting downward from each side of the frame B′ are two curved bars, *h*, which are pivoted together at their lower ends, as shown at *g*′, and the upper ends of which are spread apart, and are secured to the side of the frame B′ by means of pins or screws *g**, the said upper ends of the bars *h* being furnished with any desired number of transverse holes, so that they may be raised or lowered when desired.

Supported at each side by the same pivots which unite the lower ends of the bars *h* is a shovel-plow, D, the share of which projects forward from its central part, and has its two slides made sloping back toward the side and rear of the machine, as shown at *h*′ in Fig. 2. The point *h** of the said shovel-plow may be either formed in one piece with the same, or be made detachable therefrom, if desired, and should be situated in line with the point or angle formed by the junction of the two sloping sides of the guard C*.

Projecting upward from each side of the plow D is an upright bar, *i*. The upper ends of these bars *i* are connected by links or short rods *i** with short arms or levers *j*, one of which is attached to each end of a transverse rock-shaft, *j**, situated at the rearmost end of the frame B′, and furnished with an upwardly-projecting lever, *k*, by means of which it is operated when desired. This rock-shaft *j** is also furnished with a ratchet-wheel, *k*′, which is acted upon by a pawl, *k**, to retain the rock-shaft in position when the lever *k* is moved back to elevate the plow D and the forward part of the machine, as will be hereinafter set forth.

The forward ends of the short levers *j* are connected with the rearwardly-projecting ends of the forked rear portion of the draft-pole B by means of suitable chains, as shown at *i*′, while the rearmost ends are connected by chains *a*′′ with the forward end of a tilting frame, F, situated at the rearmost part of the frame A, as will be hereinafter fully set forth.

Extending back from each side of the plow D is an inclined arm or bracket, *m*, and extending transversely from one to the other of these brackets *m* are two shafts, *m*′, one near the outer and the other near the inner end of the said brackets, each shaft *m* being furnished at each end, at the inner sides of the brackets, with a toothed wheel, *m**. An endless chain, *n*, passes over the toothed wheels *m** at each side of the machine, and the two chains are connected by transverse rods or bars *n*′ in such a way that the said rods and chains constitute an inclined endless apron situated in rear of the plow D, and the position of which is shown more clearly in Figs. 1 and 2, the aforesaid rods *n*′ being placed at such a distance apart as to prevent the potatoes from falling between them, at the same time that the passage of the dirt between them is allowed.

*n** is a small pulley secured upon one end of the rearmost shaft, *m*′, outside of the bracket *m*, and connected by a belt or chain, *o*, with a large double-grooved pulley, *o*′, secured upon the rearmost axle, A′, in such manner that the rotation of the said axle will cause the revolution of the endless apron *n n*′, with its upper surface moving toward the rear of the machine.

*o** represents a plate of sheet metal or other suitable material, which is situated within the endless apron *n n*′, and supported at its front and rear edges by the shafts *m*′. Situated behind the inclined endless apron *n n*′, and at a lower level than the rear edge thereof, is a slotted horizontal shaking-screen, D′, the forward end of which is supported by a forwardly-projecting arm, *p*, which is attached to the under side of the rearmost portion of the shovel-plow D by means of a vertical pivot, *p*′, and the rearmost end of the said screen is furnished with an arched brace, *p**, from which there projects upward an arm, *r*. This arm *r* is pivoted to a transverse bar, *r*′, of the frame A, as shown at *r**, and has its upper end forked and turned back in a horizontal position, as at *s*. A cam-wheel, *s*′, secured upon the shaft *f*′, has its edge placed in this forked end of the arm *r*, so that the rotation of the said shaft *f*′ communicates a vibrating or shaking motion to the screen D′. The screen is intended to be made of sheet metal, and has its sides turned upward to prevent the potatoes being thrown laterally therefrom during the operation of the machine; furthermore, the screen being furnished with any desired number of longitudinal slots of such a size as to permit the passage through them of the dirt or earth, but not of the potatoes, the operation of the screen being substantially the same as if made of a series of longitudinal bars.

D* represents a horizontal transverse plate, which is situated in rear of and at a somewhat lower level than the screen D′, the forward edge of the said plate projecting somewhat underneath the rear edge of the screen D′, as shown in Figs. 1 and 2. This plate D* is suspended from the side of the frame A by means of vertical bars or arms *s**, formed rigidly upon the ends of the said plate D*.

E are two bars, which are fixed opposite each other upon the inner sides of the frame A, in rear of the screen D′ and plate D*, the upper ends of the said bars being inclined backward at a slight angle to a vertical position, as shown in Fig. 1. Working in bearings formed respectively in the upper and lower ends of these bars E are two transverse shafts, *t*, the upper one of which is furnished at each end, inside of the bars E, with a toothed wheel, *t*′,

while the lower one is furnished with plain pulleys or wheels t''. These toothed wheels carry an endless apron formed by two endless chains, n, and transverse rods u', extending from one of the said chains to the other. Every third link of each chain is made triangular in its shape, as shown at n^*, and the outer ends of the triangular links of the two chains being connected by transverse rods v. The said rods v, with the rods u' behind them, and the triangular links aforesaid, constitute triangular buckets, which convey the potatoes from the plate D*, as will be presently fully set forth. One end of the uppermost shaft t projects out beyond the bar E thereof, and is furnished with a gear-wheel, v', which gears into a larger gear-wheel, v^*, secured upon that end of the rear-axle, A', opposite that to which the pulley o' is secured. The said gear-wheel v^* also gears into a suitable pinion, w, secured to the end of the shaft f' that carries the cam-wheel s' and pulley f.

Situated upon the rearmost portion of the frame A, and pivoted thereto by transverse pivots in such manner that it may be tilted, when required, so as to elevate its rearmost end, is a supplemental horizontal frame, F, and formed in the rearmost portion of this frame F is a hopper, F', while situated immediately over this hopper is a slotted screen, G, which is pivoted at its forward edge, near the center of the said edge, to the frame F by means of a vertical pin, w', and has sides or lateral edges turned up in the same manner as those of the screen or shaker D', and for the same purpose. Projecting downward from the rear edge of this screen G, in line with the pin w', is a forked spur, w^*. A cam-wheel, G', has its edge fitted into this forked spur in such a way that its revolutions communicate a shaking or vibrating movement to the screen G, the said cam-wheel G' being secured upon a transverse shaft, G*, situated at the rearmost portion of the frame F, and furnished at one end with a pulley, x, which is connected with the large pulley o' by means of a belt or chain, x'. Formed underneath the rearmost end of the frame F, and suspended therefrom by suitable hangers or arms, is a horizontal platform, H, on which are placed two baskets, I and J, so that the potatoes which pass through the slots in the screen G fall into the basket I, and those which pass over the edge of the said screen fall into the basket J.

K is a spring-seat placed over the central portion of the frame A, and which is occupied by the driver when the machine is used.

Horses or other suitable draft-animals being attached to the draft-pole B in the usual or in any suitable manner, the machine is drawn forward astride of a row or drill of potato-plants, the rearmost wheels, A*, rotating the rear axle, A', which, acting through the pulleys, gear-wheels, and belts hereinbefore described, causes the endless aprons $n\ n'$ and $u\ u'$ to revolve the screens D' and G to shake or vibrate and the shafts c^* to rotate. As the machine is drawn along the guard C* parts the tops of the potato-plants, throwing them outward toward the cutters C', and the rotating cutters shear them off between the said rotating cutters and the inclined sides of the stationary cutters C', the guard C* then throwing them out sidewise from the hills, in order that they may not be caught up by the machine, which would likely be clogged thereby. The plow D being drawn through the ground at such a depth as to pass underneath the potatoes and the soil immediately surrounding them, the potatoes and the soil with which they are intermingled are caused to pass upward and backward over the inclined surface of the row to the endless apron $n\ n'$, which carries them back to the horizontal screen D' and deposits them thereon, the greater portion of the soil falling between the transverse rods n' of the said endless apron, and passing along the inclined plate o^* to the ground. The shaking motion of the screen D' then causes the greater portion of the remaining soil to pass down through the slots thereof, and causes the potatoes to pass back and fall from the rearmost edge of the said screen upon the suspended plate D*. As the endless apron $u\ u'$ revolves, the triangular links n^*, which constitute the ends of the triangular buckets thereof, strike the rearmost edge of the aforesaid plate D* and force it forward underneath the rear edge of the screen D', so that the said rear edge of the screen shoves the potatoes back from the plate D*, whence they fall into the triangular buckets just mentioned, and are carried upward by the apron $u\ u'$ and deposited upon the screen G, the shaking motion of which causes the smaller potatoes to pass through the slots in the said screen into the basket I, while those too large to pass through the said slots fall from the rear edge of the screen into the basket J. In case one or more hills should be out of line with the remainder of the row, the plow D may be turned laterally, to be made to pass under the same, by pushing the upper part of the lever B* forward, so as to bring the spur c from the notch in the transverse bar b^*, and then turning the said lever sidewise, thus turning the frame B' upon its vertical pivot b, and consequently the point of the plow toward one side or the other, as desired.

The depth to which the plow enters the ground is regulated by adjusting the bars h by means of the holes formed in their upper ends, as hereinbefore mentioned.

When it is required to turn the machine around, the lever k is brought back, which raises the forward end of the machine, throwing the weight thereof upon the necks of the horses by which the same is drawn, and, acting through the chains a'', tilts the frame F so that the rearmost end thereof, with the platform H, is also raised, as hereinbefore explained, at the same time that the arms or short levers j, acting through the links i^*, bring back the upper ends of the bars i, thus turning the plow D upon its pivots g' and elevating the point

thereof, which being done, the pawl *k** catches in the ratchet-wheel *k'* and holds the several parts in the position just described. The rearmost wheels, A', only being on the ground, the machine may be turned around with as great ease and facility as any two-wheeled vehicle.

What I claim as new, and desire to secure by Letters Patent, is—

1. The horizontal rotating cutters C, fixed cutters C', and guard C*, arranged in combination with each other and with the shovel-plow D, substantially as herein set forth, for the purpose specified.

2. The suspended plate D*, combined and in relation with the vibrating screen D', and with the buckets of the endless elevating-apron *u u'*, substantially as herein set forth, for the purpose specified.

3. The endless elevating-apron *u u'*, furnished with buckets, as described, and arranged, in relation with the vibrating screen G and the hopper F', substantially as herein set forth, for the purpose specified.

4. The arrangement of the platform H at the rearmost end of the machine, and in relation with the hopper F' and vibrating screen G, substantially as herein set forth, for the purpose specified.

5. The suspension of the shovel-plow D from the vertically-pivoted frame B', to enable the said plow to be turned laterally when desired, substantially as herein set forth.

6. The lever *k*, short levers or arms *j*, links *i**, and chains *i'*, arranged with reference to each other, and with the bars *i* of the plow D and the rearwardly-projecting end of the draft-pole B, substantially as herein set forth, for the purpose specified.

7. The supplemental tilting frame F, sustaining the platform H, and so arranged upon the rearmost end of the machine and combined with suitable operating mechanism that its rearmost end will be raised simultaneously with the elevation of the forward end of the machine, substantially as herein set forth, for the purpose specified.

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