

S. P. SMITH.

Improvement in Horse Hay Rakes.

No. 123,053.

Patented Jan. 23, 1872.

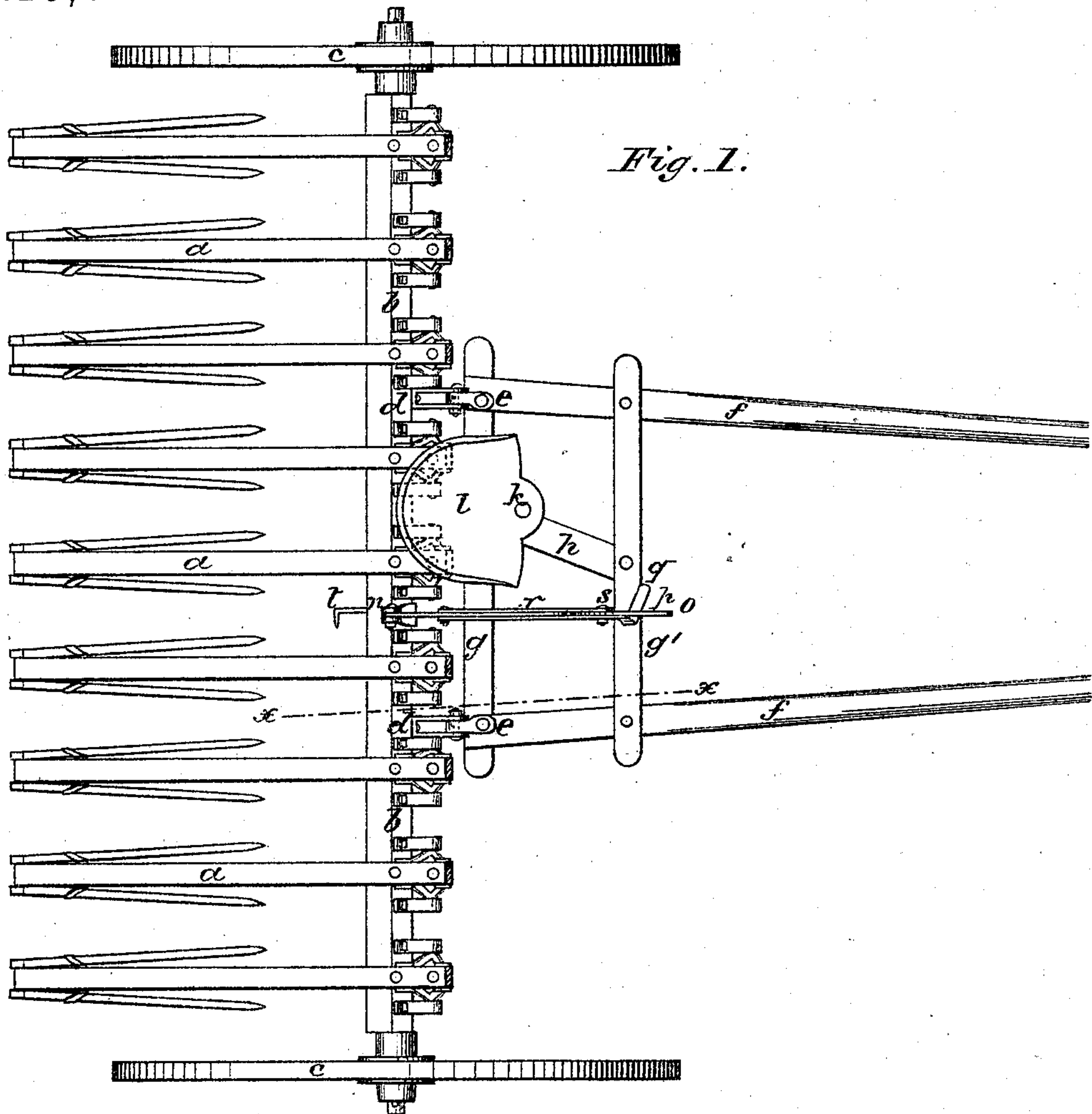


Fig. 1.

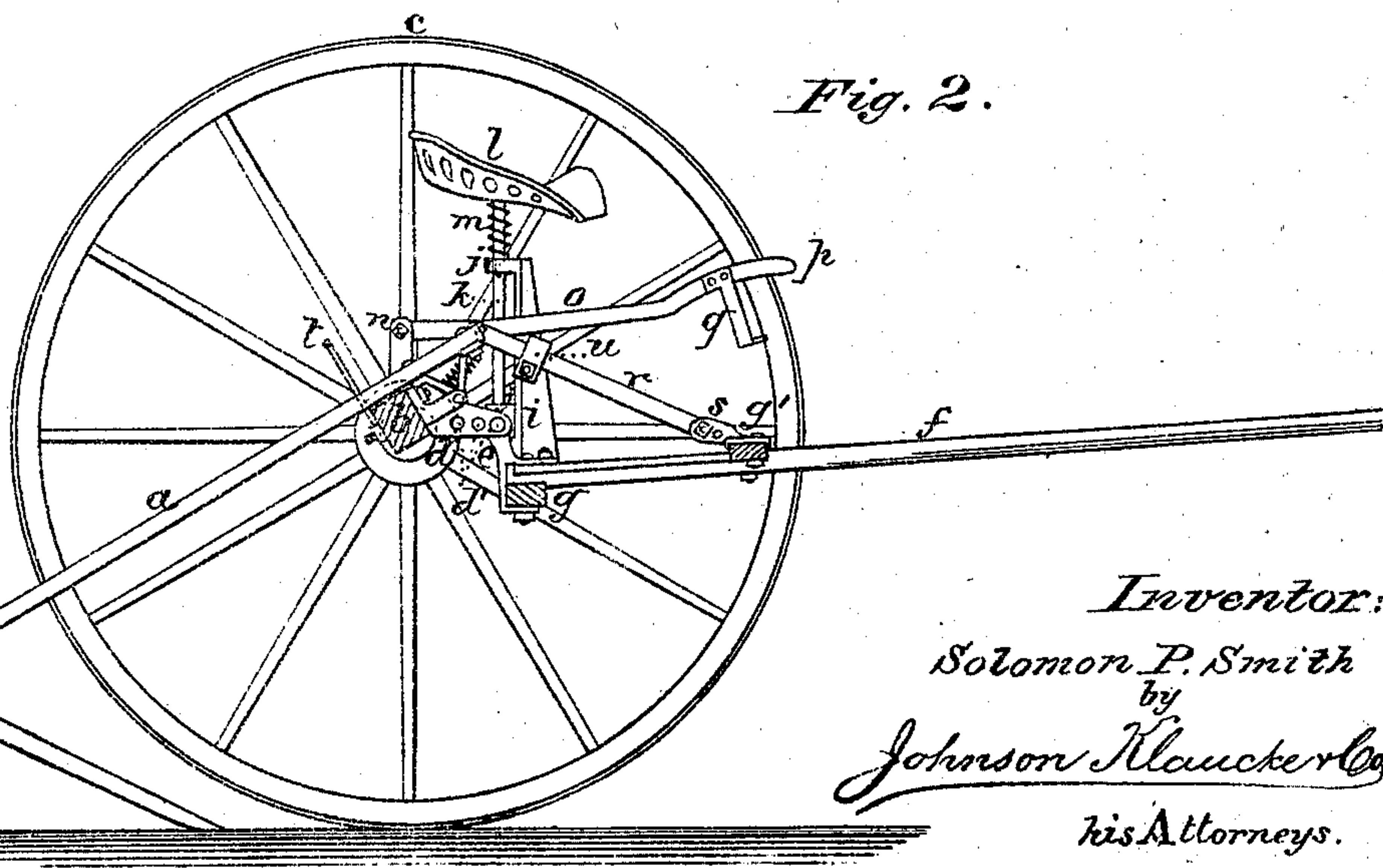


Fig. 2.

Witnesses:

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Inventor:

Solomon P. Smith

by

Johnson Klaucke & Co.

his Attorneys.

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Fig. 3.

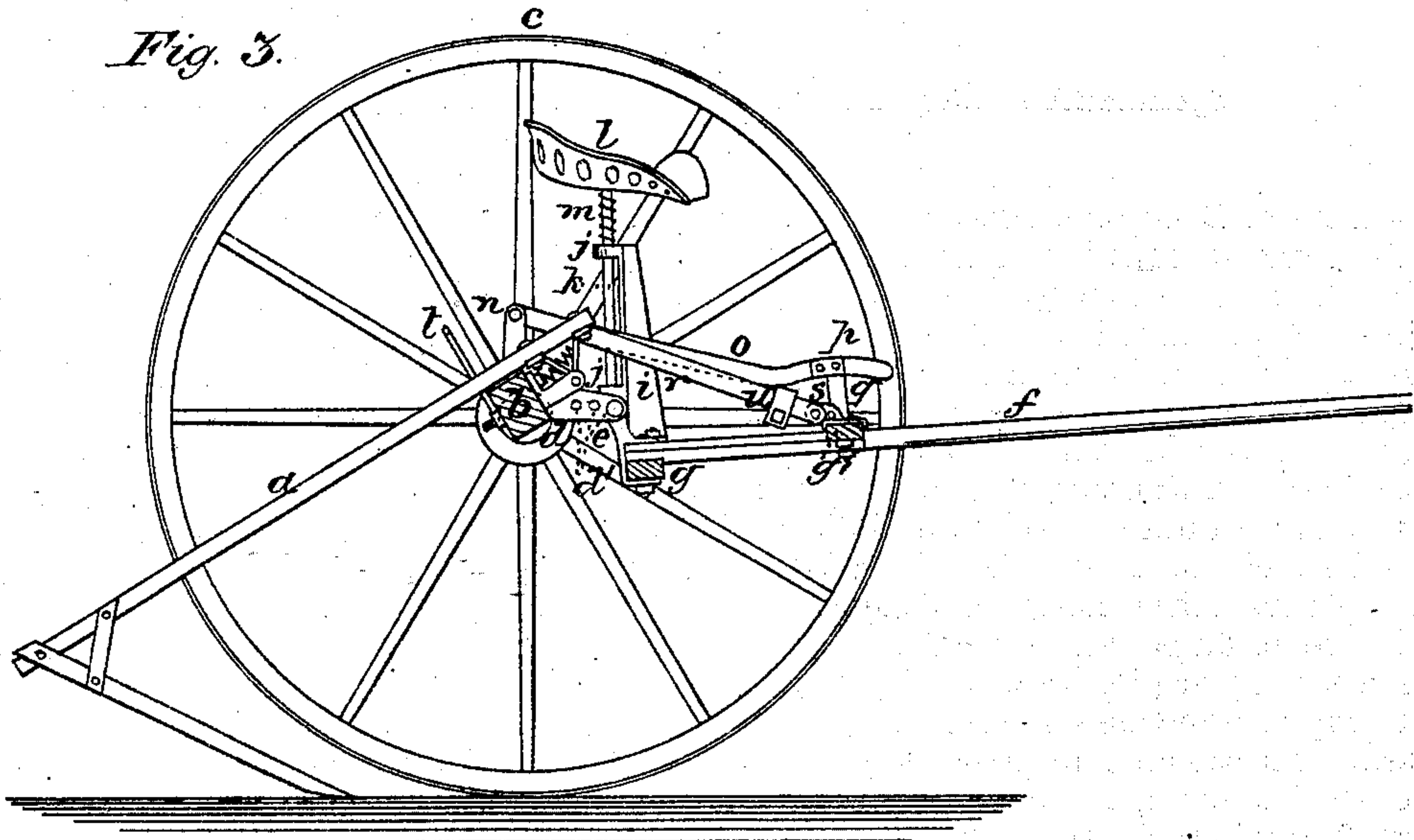


Fig. 4.

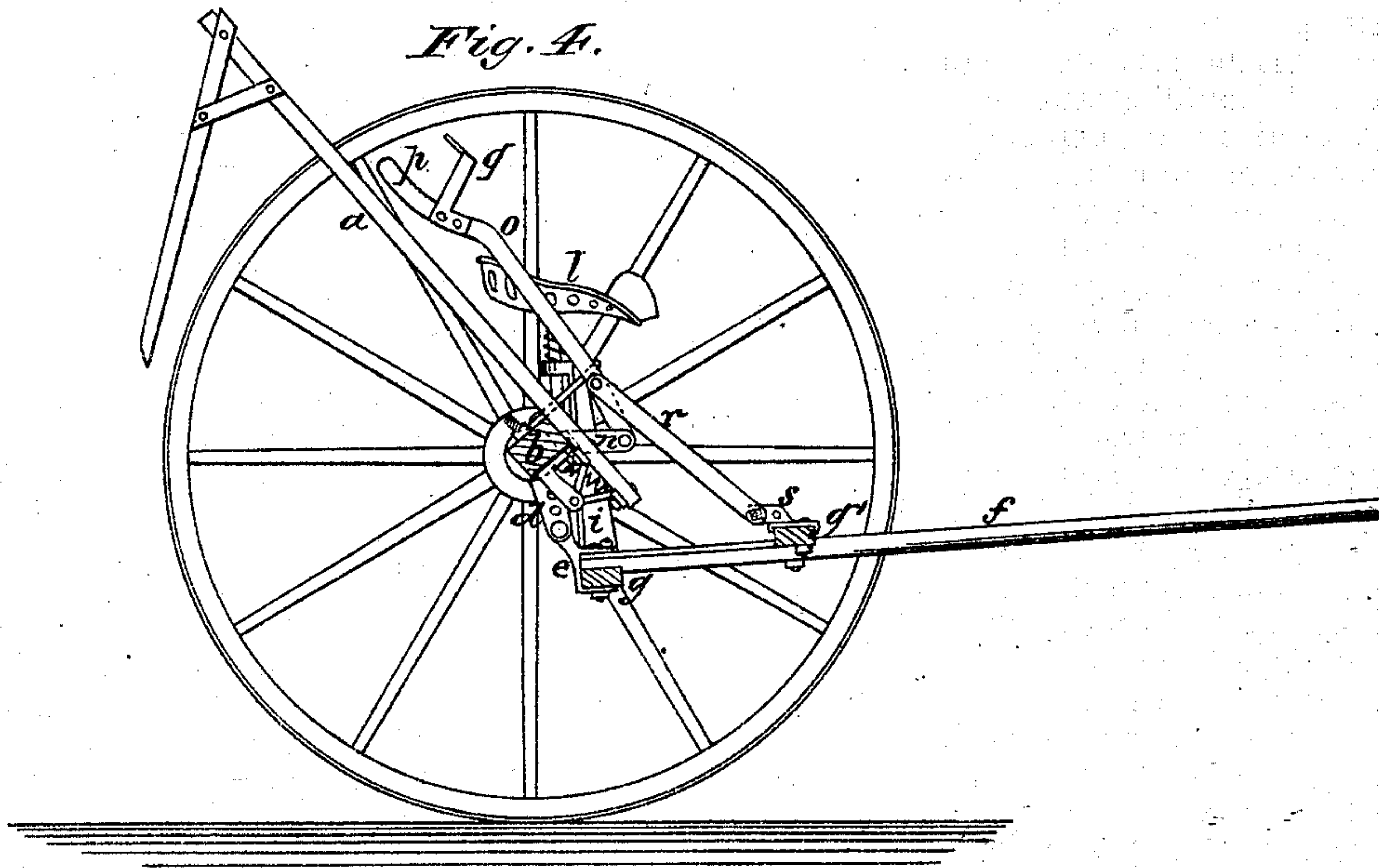


Fig. 5.



Fig. 6.



Witnesses:

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# UNITED STATES PATENT OFFICE.

SOLOMON P. SMITH, OF WATERFORD, NEW YORK.

## IMPROVEMENT IN HORSE HAY-RAKES.

Specification forming part of Letters Patent No. 123,053, dated January 23, 1872.

*To all whom it may concern:*

Be it known that I, SOLOMON P. SMITH, of Waterford, in the county of Saratoga and State of New York, have invented a new and useful Improvement in Horse Hay-Rakes, of which the following is a specification:

My invention consists of certain novel means of adjustment, whereby a more perfect balance of the driver and the rake-teeth of the machine may be attained under any circumstances, as will be hereinafter more fully described.

In the accompanying drawing, Figure 1 represents a top or plan view of a horse hay-rake with my improvements attached. Fig. 2 represents a sectional side elevation of the same, the section being in the line *x x*, Fig. 1, the parts being in the positions they occupy when the machine is ready for work. Figs. 3 and 4 are similar views, the parts being in different positions; and Fig. 5 is a detached view of the adjustable pivot-brackets of the thills. Fig. 6 is a horizontal section of the toggle-link and adjustable clamp thereof.

My invention relates to that class of rakes in which the teeth are secured to the axle in such a manner as to have a free movement independent of that of the axle, and in which the thills are so pivoted to the axle that the rotation of the latter by suitable levers or other means elevates the rake-teeth from the ground to discharge the gathered load. The rake-teeth *a* are pivoted on the axle *b*, in the manner described in Letters Patent granted to me, and bearing date of March 7, 1871, No. 112,507, and have a free upward movement independent of that of the axle, which latter is supported by wheels *c*, revolving loosely on each end of the same. At suitable distances from the wheels and from each other bracket-bearings *d* are secured to the axle *b*, between the sides of which arms *e*, on the ends of thills *f*, are pivoted. The sides of the bracket-bearings *d* are provided with a series of holes, *d'*, so as to enable the pivot of the thills to be brought nearer to or further away from the axle *b*, in order to balance, in connection with the adjustable toggle-links, the weight of the driver on the seat. The thills *f* are connected by cross-bars *g g'*, which are braced by a piece, *h*, on which, over the cross-bar *g*, is secured a standard, *i*, having rear projections *j*, provided

with square openings, in which the stem *k* of the seat *l* has its bearings, the seat being held elevated above standard *i* by a spring, *m*, surrounding the stem *k*, above the upper rear projection *j*. At a suitable point at one side of the seat a short standard, *n*, is secured to the axle *b*, to which is pivoted the rear end of a lever, *o*, the forward end of which terminates in a curved handle, *p*, from which extends downwardly a foot-piece, *g*. To this lever *o*, near its rear end, is pivoted a link, *r*, consisting of two plates or bars, and which, at its forward end, is pivoted to an upright, *s*, secured on the cross-bar *g'*, which upright is provided with several holes *s'*, to enable the distance between the pivot of the link to the lever *o*, and its pivot to the upright *s*, to be shortened or lengthened in proportion and in accordance with the adjustment of the thills *f* nearer to or further away from the axle *b*. To the rear side of the axle *b* is pivoted a hook, *t*, so arranged that when the lever *o* is raised, to keep the teeth elevated from the ground in going to or from the field, the said hook *t*, by being hooked over the lever *o*, will hold it and the teeth in an elevated position until released from its grasp. Sliding on the link *r* is an adjustable clamp, consisting of a slotted piece, *u*, straddling both bars of the link, while a piece, *v*, between these bars is held to the slotted piece *u* by means of a bolt, *w*, passing through both of these pieces beneath the link. This clamp is securely held in any desired position by means of a thumb-nut, *y*, by loosening which the clamp may be slid to any position on the link. The nearer to the rear end of the link the clamp is adjusted, the higher will the pivot of the link *r* to lever *o* be raised above the line between the pivots on the uprights *n* and *s*, when the lever *o* is brought down and rests upon the clamp; and the nearer the clamp is adjusted to the forward pivot of the link, the nearer into the same line or plane will come the three pivots of lever *o* and link *r*; and the nearer in line these three pivots are, the more weight will be required on the driver's seat to balance the teeth, and consequently more effort of the driver to raise the lever to revolve the axle and elevate the teeth. Consequently the change of weight on the driver's seat can be compensated, or the point



at which a certain weight on the driver's seat will revolve the axle with little effort can be determined, with the greatest accuracy by the arrangement of the clamp on the link, which will regulate the extent of the downward movement of the lever *o*, and consequently the relative position of the center pivot to the two end pivots, on which relative position depends the weight necessary to operate the axle; and, moreover, the clamp on the link can be so arranged that the weight of the driver just overbalances the weight of the teeth, and by itself is sufficient to operate the axle, in which case the driver keeps his foot on the foot-brace *g*, and removes it every time he desires to discharge the gathered hay, which removal of the foot allows the driver's weight to operate the axle and raise the teeth. The driver then depresses the lever *o* by hand until he can place his foot on the brace *g* again. The clamp on the link *r* alone, however, is not sufficient of itself to counterbalance the weight of the driver or to compensate for the difference of weight of different drivers. The chief compensation for such difference, especially if such difference be considerable, is made by changing the pivots of the thills nearer to or further away from the axle, in combination with the adjustment of the front pivot of the toggle-link. Thus by placing the pivots in the holes in the bracket-bearings *d* nearest to the axle the adjustment will be fixed for the operation of the axle and teeth by a heavy driver, while by placing the thill-pivots in the holes furthest away from the axle, the weight of a boy of seventy-five or eighty pounds will be sufficient to operate the axle. And thus, after the general compensation has been accomplished by arranging the pivots of the thills, the driver can from his seat, before starting, make the finer and more perfect adjustment by changing the clamp on the link; and this adjust-

ment before starting will be sufficient while the same driver and the same horse operate the machine. For even the height of the horse will have some influence on the operation of the axle by the weight of the driver, for the elevation or depression of the front part of the thills will have a corresponding effect on the elevation or depression of the teeth.

It will be observed that in every adjustment of the parts described the drag-bars should always be above the axle to allow them to perform their well-known function.

A very essential advantage in the functions of the adjustable clamp, in addition to those already mentioned, is, in the event of the wearing of the pivots not only of the thills, but of the toggle-joint also, the clamp can be adjusted to compensate for such wear, no matter how small the degree, so that in this respect the clamp performs an important office in perfecting and maintaining the perfection of the balancing of the teeth.

Having described my invention, I claim—

1. A toggle-joint lever, in combination with an adjustable clamp and a foot-brace, arranged, with respect to each other, the pivots of the thills, and the driver's seat, essentially as and for the purpose described.

2. In combination with an adjustable clamp, arranged as described, I claim the adjustable thill-pivots and the adjustable link-pivots of the toggle-lever *o*, whereby adjustment is effected to compensate for difference both in the weight of the driver and the height of the horse, essentially as and for the purpose described.

3. The double bars of the link *r*, in combination with the lever *o* and the clamp *u v*, essentially as and for the purpose described.

SOLOMON P. SMITH.

Witnesses:

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