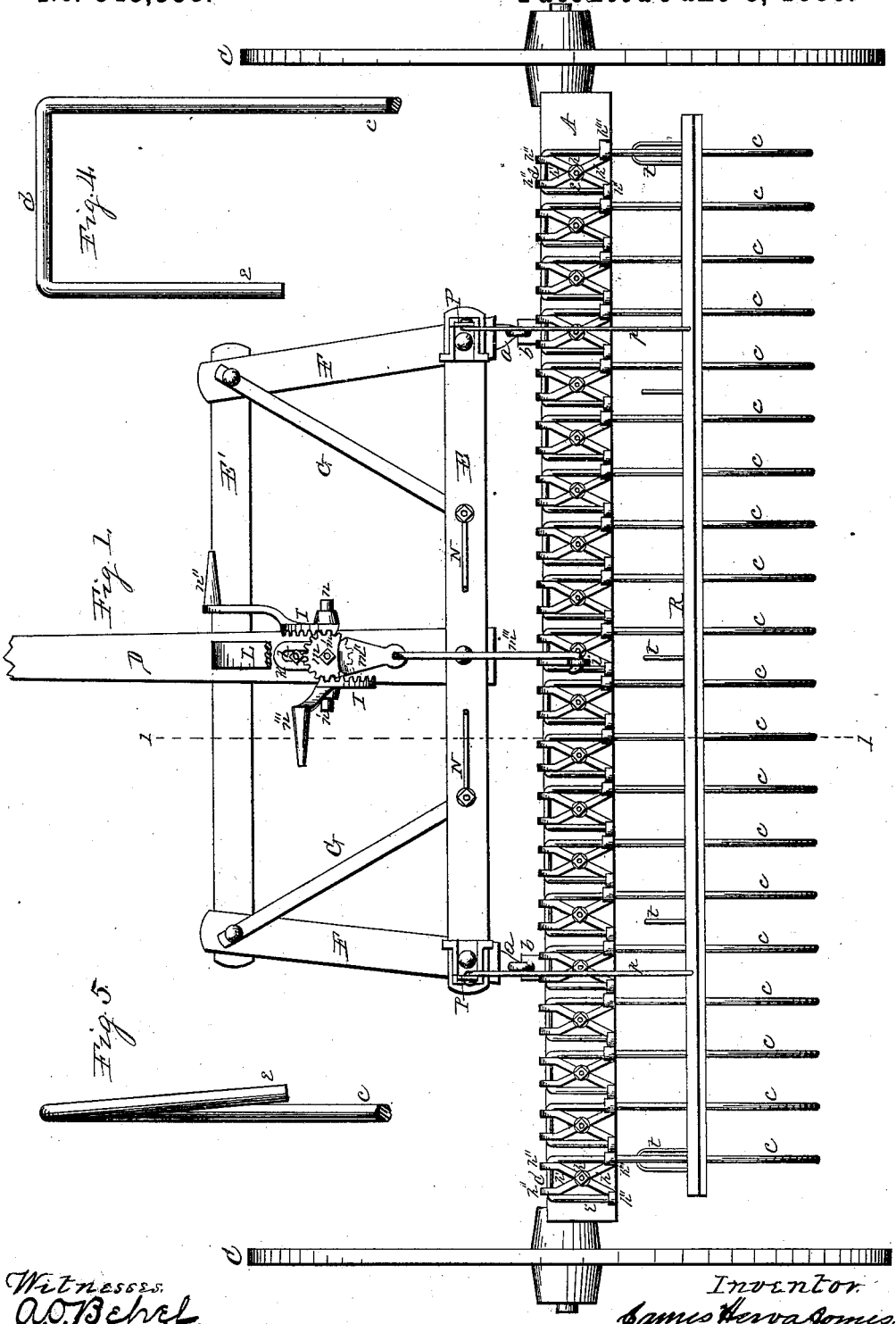
(No Model.) 3 Sheets—Sheet 1.

# J. H. JONES.

## HORSE HAY RAKE.

No. 343,538. Patented June 8, 1886.



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## HORSE HAY RAKE.

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Fig. 7.

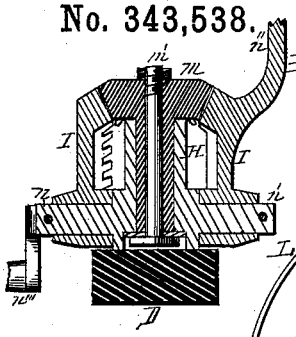

Fig. 2.



Fig. 6.

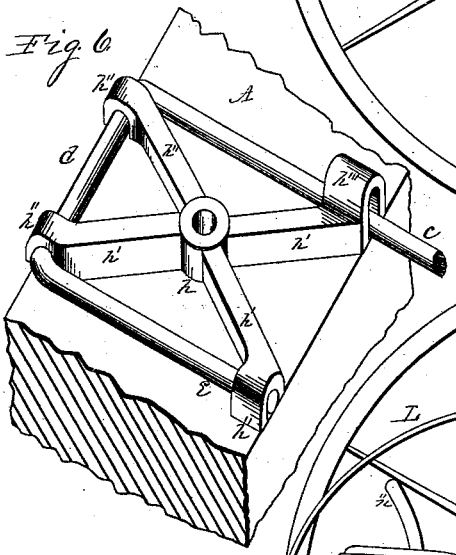

Fig. 3.



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## HORSE HAY RAKE.

No. 343,538. Patented June 8, 1886.

Fig. 11.

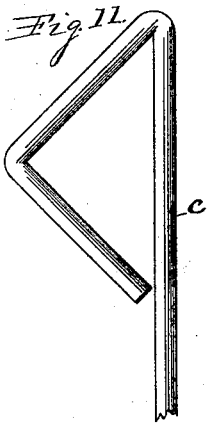



Fig. 8.




Fig. 10.

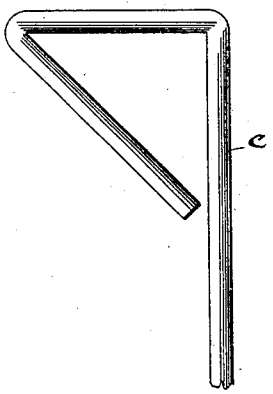
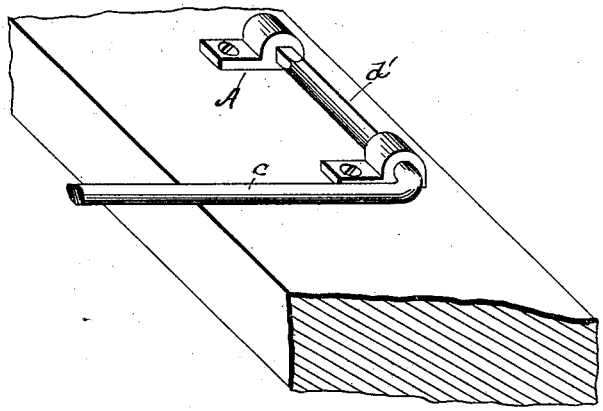



Fig. 9.

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# UNITED STATES PATENT OFFICE.

JAMES HERVA JONES, OF ROCKFORD, ILLINOIS, ASSIGNOR TO EMERSON, TALCOTT & CO., OF SAME PLACE.

## HORSE HAY-RAKE.

SPECIFICATION forming part of Letters Patent No. 343,538, dated June 8, 1886.

Application filed January 26, 1885. Serial No. 154,021. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES HERVA JONES, a citizen of the United States, residing in the city of Rockford, in the county of Winnebago and State of Illinois, have invented new and useful Improvements in Horse Hay-Rakes, of which the following is a specification.

This invention relates to that class of hay-rakes in which spring-teeth are employed, and its object is to produce a reliable and efficient machine at a reduced cost. To this end I have designed and constructed the machine represented in the accompanying drawings, in which—

Figure 1 is a plan view of a rake embodying my invention. Fig. 2 is a lengthwise vertical central section on dotted line 1 on Fig. 1, showing the parts in working position. Fig. 3 is also a lengthwise vertical central section on dotted line 1 on Fig. 1, showing the parts in position when unloading the hay. Fig. 4 is a plan view of the head end portion of a tooth. Fig. 5 is an edge view of the head end of a tooth. Fig. 6 is an isometrical representation of the head end of the tooth in its connection with the rake-head, and Fig. 7 is a transverse vertical section on dotted line 2 on Fig. 3. Fig. 8 is an isometrical representation of a modified form of the foot-lifting mechanism. Fig. 9 is an isometrical representation of a modification of the tooth-head and of its connection with the rake-head, and Figs. 10 and 11 show modifications of the tooth-head.

The axle-tree of my improved rake is composed of a horizontal portion, A, and a vertical portion, B, of wood, securely joined to each other by means of suitable screw-bolts passed through the parts. The ends of this axle-tree are fitted with axle-arms fixed to the axle-tree in an eccentric position forward of the axial center of the axle-tree.

C represents the carrying-wheels, mounted to revolve on the axle-arms of the axle-tree.

At D is represented the tongue, of suitable dimensions, provided at its rear end with a tongue-frame consisting of the parallel transverse bars E and E′, centrally fixed to the tongue, oblique end bars, F, fixed to the end portions of the parallel bars, and oblique brace-bars G, connecting the rear bar, E, with the forward corners of the frame, all of which are securely fixed to each other at their several crossings by means of sufficient screw-bolts passed through the parts. The rear corners of the tongue-frame are jointed to the axle-tree by means of hinge-joints consisting of the parts *a* and *b*, securely fixed to their respective parts, and in such a manner that the axle-tree will be free to turn in its wheel-supports from a position in which part A is horizontal, forward to a position in which part A is vertical, and vice versa.

At *c* are represented spring rake-teeth produced in a suitable curve, having their head-end portions in this instance produced in the rectangular form shown, consisting of the end portion, *d*, and the return-arm *e*. The end portion, *d*, is bent at a right angle to the main portion *c* of the tooth, and lies in the same horizontal plane when the tooth is in working position. The return-arm *e* is bent at a right angle to the end portion in the direction of the tooth *c*, but in a plane preferably upwardly inclined to the plane of the tooth *c*, as clearly shown in Fig. 5, in such a manner that when forced and held in the plane of the tooth it will produce a downward torsional spring action on the tooth. The head ends of these rake-teeth are placed upon the upper face of the horizontal beam portion of the axle-tree at equal intervals, and are fixed in position thereon by means of a spider-formed casting having a central hub, *h*, fitted with an axial opening to receive a screw-bolt to fix it in place.

From the hub *h* extend radiate arms *h′*, having their ends at *h″* fitted to embrace the bent arms of the tooth-head snugly, and one of these radial arms has its end portion at *h‴* fitted to span the main arm of the tooth-head, and the opening to receive the tooth is elongated vertically, to permit an up and down movement of the tooth therein. This spider is placed in position on the head of the tooth placed on the axle-tree, and a suitable screw-bolt is passed upward through the beam, extending upward through the axial opening in the spider-hub, and receives a screw-nut, which serves to fix and hold the parts in place firmly. In this construction and connection of the tooth and

the axle-tree, the torsional spring action of the tooth operates to hold it in its lowest position limited by the beam with a force sufficient for the purposes of a rake, and the elongated opening $h'''$ in the spider-arm spanning the main arm of the tooth, permits a limited upward movement of the tooth to override obstructions. One of these spider-formed castings, at or near the center of the rake, is provided with an uprising arm, $i$, for a purpose which will hereinafter appear. The main object of this part of my invention is to utilize the torsional spring action of the lateral end bar of the tooth, and in this instance in connection with the direct spring action of the parallel arms of the head portion thereof. The same result may, however, be attained by other forms of the head-end portion of the tooth than that shown and described—as, instances, instead of the rectangular form, the head may be produced in a right-angled triangle, as shown, or in a triangle, as shown in Fig. 11, or other known forms capable of use in connection with the rake-head to utilize the torsional spring action of the lateral end arm thereof may be employed, or the return-arm may be omitted and the end portion of the lateral arm fixed to the rake-head, as shown in Fig. 9, or in any known manner, to render the torsional spring action of the lateral arm available.

At H is represented a vertical tubular bearing having a foot-support, $k$, slotted lengthwise, as shown at $l$. This tubular bearing is placed on the upper face of the rear portion of the tongue, and is fixed thereon by means of holding-bolts passed through the tongue and through the slotted openings of the foot-support in a manner to permit a lengthwise adjustment of the bearing on the tongue.

At $m$ is represented a bevel-toothed gear-wheel, fitted with a depending tubular journal supported to oscillate within the vertical tubular bearing, and held in place by means of a screw-bolt, $m'$, passed through its axial center. This bevel-toothed gear-wheel is fitted with a crank-arm, $m''$, projecting from its upper face, and a link, $m'''$, connects its free end with the upper end of the arm $i$, rising from the spider employed to fix the rake-tooth to the axle-tree.

At $n$ and $n'$ are represented stud-axles projecting laterally from opposite sides of the tubular bearing.

At I are represented bevel-toothed gear-segments, supported to oscillate on the stud-journals $n$ and $n'$ in such relation to the bevel-toothed gear-wheel that the teeth of the segments shall engage the teeth of the gear-wheel in working contact. The gear-toothed segments are each provided with a crank-arm pedal, $n''$ and $n'''$, of a suitable conformation to receive the foot of an operator mounted in a seat supported on the tongue-frame. The construction and arrangement of these parts in this instance are such that when the pedal $n''$ on the right side is depressed in its forward position by the foot of the operator the movement of the gear-wheel will carry the crank-arm rearward, and, by reason of its link-connection with the uprising arm $i$, will hold the rake-teeth in their working position, as shown in Fig. 2, and when the pedal $n'''$ on the left side is depressed forward by the foot of the operator the movement of the gear-wheel will carry its crank-arm forward, and by reason of its link-connection with the uprising arm $i$ will elevate the rake-teeth to unload or discharge the hay, as shown in Fig. 3, and can be held in their elevated position, as therein shown. The object of this part of my invention is to enable the driver to control the vertical movements of the rake with his feet in such a manner that the movement of one of the foot-pedals to raise the rake-teeth will place the other foot-pedal in position to be operated by the other foot to lower the rake-teeth, and vice versa, alternately. This same result may be produced by other devices than those shown and described—as an instance, a transverse shaft supported to oscillate in about the position of the stud-journals $n$ and $n'$, and having its center fitted with a vertical crank or lever arm, to receive the forward end of the link $m'''$, prolonged to connect therewith at its upper end, and the opposite ends of the transverse shaft provided with opposite crank-arms fitted with foot-pedals, to receive the feet of the driver, all of which is clearly shown in Fig. 8, and will be readily understood without further description.

At K is represented a driver's seat mounted upon a support, L, rising from its fixed connection with the tongue, and braces N, rising from their fixed connection with the rear bar of the tongue-frame, connect with the seat-support immediately under the seat, and in connection with the support form a pyramidal frame to support the seat upon the tongue-frame in position to enable the operator mounted in the seat to operate and control the movements of the rake with his feet.

A discharging apparatus, to disengage the hay from the rake-teeth, consisting of the vertical standards P, connecting-links $p$, discharging-head R, and depending teeth $t$, constructed, joined, and applied in the manner shown, is provided, and is substantially such as are in common use and to be found in the trade.

I claim as my invention—

1. The combination, with the rake-teeth, bent to form a head, substantially as described, of a spider-frame consisting of a central hub and radial arms, whose ends are formed to embrace the bent arms of the tooth-head, one of said ends being vertically elongated to permit an up and down movement of the tooth, substantially as described.

2. A foot-pedal mechanism to operate the rake-head, consisting of a gear-wheel having a rod or link connection with the rake-head, gear-toothed segments having a gear-tooth con-

nection with the gear-wheel, and pedals connected with the gear-toothed segments, substantially as and for the purpose set forth.

3. The combination, with the rake-head or axle-tree, the tooth-head, bent as described, and the spider-frame with its hub and divergent arms, of a foot-pedal mechanism consisting of a gear-wheel having a rod or link connection with the rake-head, gear-toothed segments having a gear-tooth connection with the gear-wheel, and pedals connected with the gear-tooth segments, substantially as described.

JAMES HERVA JONES.

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