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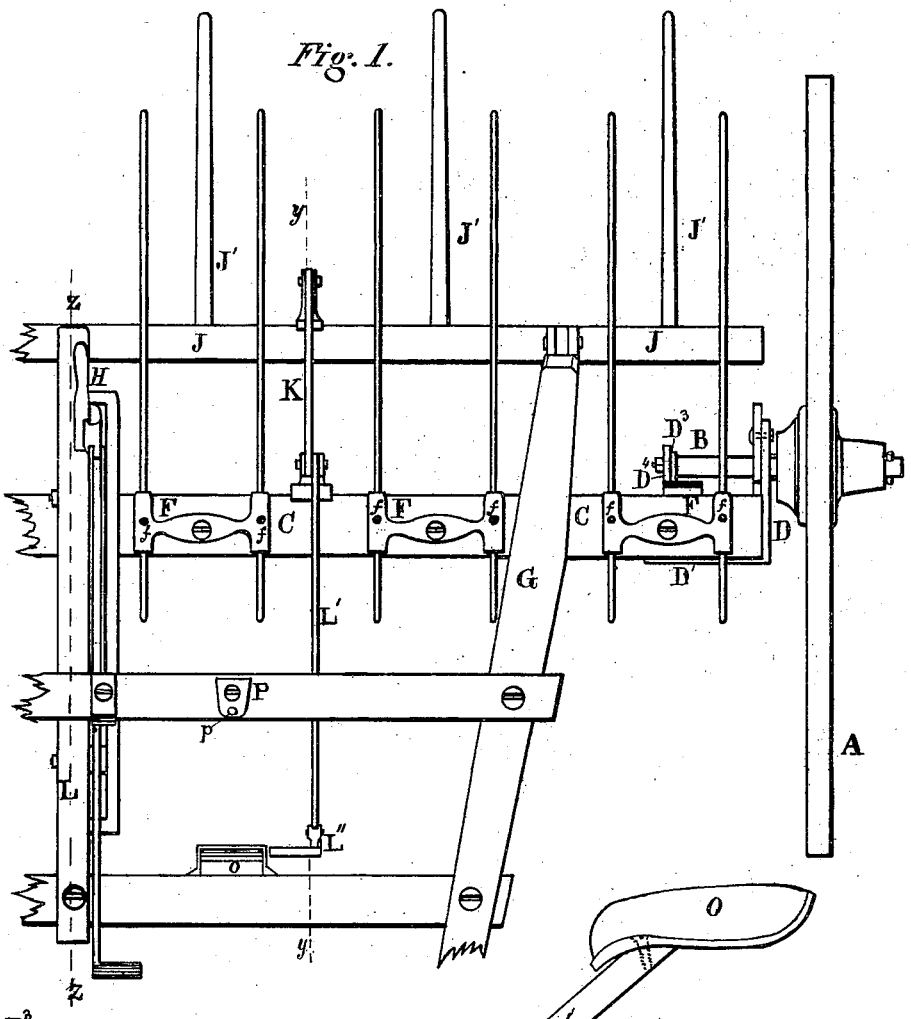
W. S. ARCHER.

HORSE HAY-RAKE.

No. 190,462. Patented May 8, 1877.

Fig. 1.



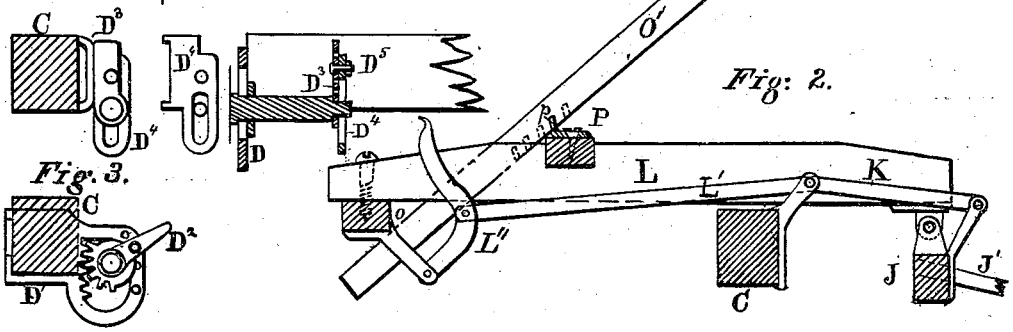


Fig. 2.

Fig. 3.

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Fig. 4.

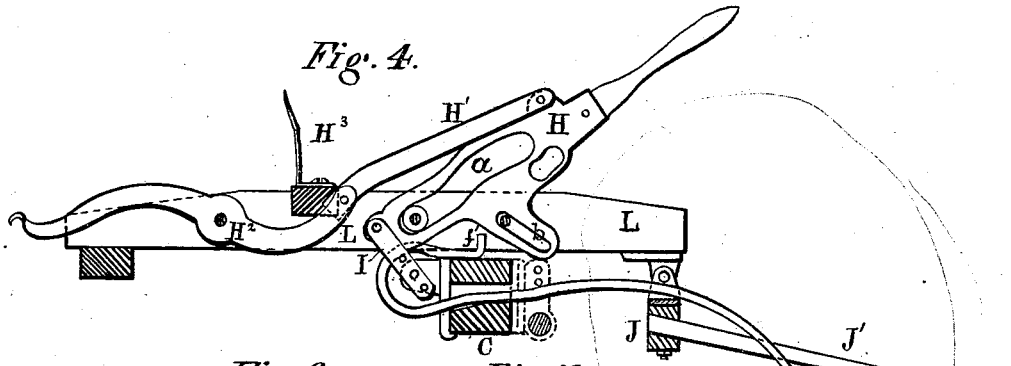


Fig. 6.

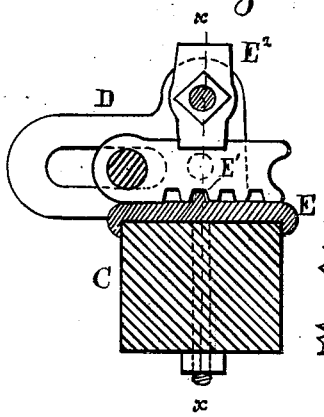


Fig. 7.

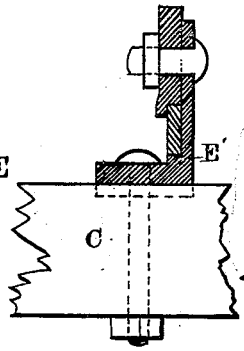
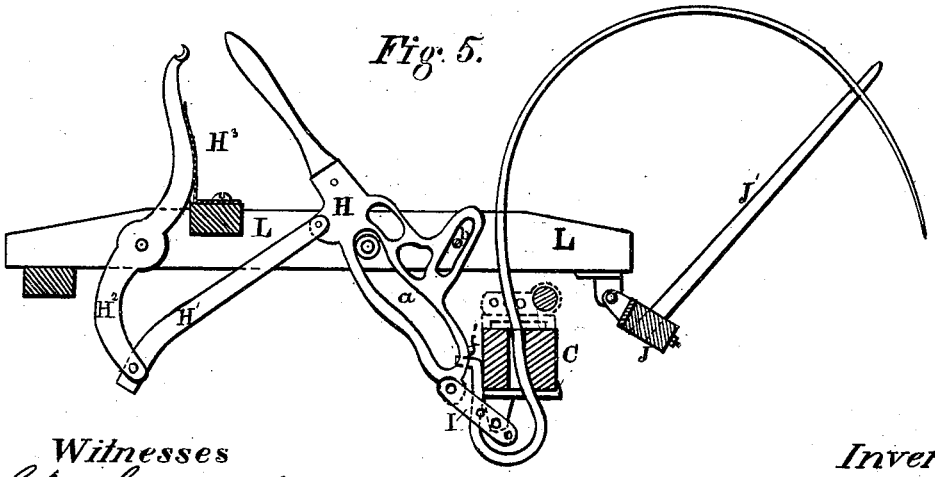


Fig. 5.



Witnesses
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UNITED STATES PATENT OFFICE.

WILLIAM S. ARCHER, OF DAYTON, OHIO.

IMPROVEMENT IN HORSE HAY-RAKES.

Specification forming part of Letters Patent No. **190,462**, dated May 8, 1877; application filed February 12, 1877.

To all whom it may concern:

Be it known that I, WILLIAM S. ARCHER, of Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Horse Hay-Rakes; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification—

Figure 1 being a plan view of so much of a rake as is necessary to show my improvements, it showing an oscillating bar hinged to the rear ends of shafts of the machine, the rods and levers for tilting the same, the devices for raising and lowering the rake-head, the method of attaching the spindles, upon which the carrying-wheels revolve, thereto, and the devices for holding the teeth in position. Fig. 2 is a cross-section on line *y y* of Fig. 1, showing the oscillating bar which carries the clearing-fingers, the rod which moves it, with its attachment to the rake-head, the foot-lever for operating the same, the adjustable seat and the cross-bars to which it is attached. Fig. 3 shows sections of detail portions, they representing a portion of the rake-head, the method of attaching the wheel-spindles thereto, and the devices for raising and lowering the head, and for holding it in its adjusted position. Fig. 4 is an elevation on line *z z* of Fig. 1, showing the levers and rods for changing the position of the head and its teeth, the manner of connecting the lever with the head, and passing the teeth through the same, as well as the relations of the rake-teeth to the clearing-fingers when the teeth are in the proper position for gathering a load. Fig. 5 is a view of the parts shown in Fig. 4, showing all of the parts in the positions in which they are placed when the load is dumped; and Figs. 6 and 7 are modifications of the devices used for raising and lowering the rake-head and its teeth, to be used on the inner end of the wheel-spindles.

Corresponding letters denote like parts in all of the figures.

This invention relates to horse hay-rakes; and it consists in the construction, combination, and arrangement of certain of the parts of which the machine is composed, as will be more fully described hereinafter.

In constructing machines of this character, I use carrying-wheels A, of any suitable size and form, they being mounted upon short spindles B, which are adjustably attached to the rake-head C, which also serves as the axle of the machine, it being of sufficient length to give the required width thereto.

Upon the ends of the head C castings D are secured, they being provided with a flange, D^1, for that purpose, while their outer ends are of the loop form, (shown in Fig. 3,) the inner surface of one side of the loop being provided with cogs or teeth, into which mesh cogs or teeth formed upon a sector-shaped lever, D^2, the outer end of which is held in position by means of a bolt or pin which passes through it, and through the outer portion of the loop of the casting D. The spindle B passes through and has its outer bearing in the sector D^2, its inner end being supported in a sliding plate, D^3, which is made to move vertically in a bracket, D^4, attached to the rake-head, the two parts being held in position with reference to each other by a bolt, D^5, which passes through them. The arrangement of the last-named parts is such that by removing the bolt or pin which passes through the sector D^2, and by slackening the nut on the bolt D^5 at the opposite end of the spindle B, and carrying the outer end of the sector either up or down, the distance between the rake-head and the earth can be varied, and consequently the distance between the lower ends of the rake-teeth and the earth can be regulated so as to adapt them to different kinds of ground and to the work to be accomplished.

When the proper adjustment has been made, the nut upon the bolt is to be screwed up, so as to hold the inner end of the spindle in position, the outer end being secured in its position by replacing the bolt or pin in the sector, and passing it through any one of the holes in the loop that will allow the outer end of the spindle to be parallel with its inner end.

I have shown in Figs. 6 and 7 a modifica-

tion of the device for holding the inner end of the spindle B, which consists of a bracket, E, attached to the rear side of the rake-head, and has a tooth or projection, E^1, which enters recesses formed in the edge of the sliding plate, which carries the inner end of the spindle B, which plate is held in position by a bolt, which passes through button E^2 and through the bracket E.

For securing the rake-teeth to the head, a casting, F, is provided, of substantially the form shown in Fig. 1, it being designed to have each casting receive and retain in position two or more of the teeth, which is accomplished by making it of sufficient length to extend from one tooth to another, or far enough to cause it to cover more than two teeth. When designed to hold only two teeth, this casting is provided, near its ends and upon its inner surface, with recesses, into which a portion of the tooth enters. This recess serves to give the tooth lateral support at its fixed end, and, in order that it may be prevented from being drawn out of its socket, a vertical aperture, *f*, is formed in the casting, through which the bent end *f'* of the tooth enters. The form of the tooth at this point is clearly shown in Fig. 4, and it will be seen that by placing two or more teeth in position and dropping the casting F upon them the upwardly-projecting portion of the teeth will enter the vertical apertures in the casting, when, by passing a bolt or screw through said casting, as shown in Fig. 1, it and the teeth attached to it will be firmly secured to the head of the rake. From the point where the teeth emerge from the castings F they extend rearward for a short distance, and are curved downward and backward, as shown in Figs. 1, 4, and 5, the lower portion of the loop thus formed passing through slots formed in the rake-head, from which point they extend rearward and downward, as shown, the slots in the axle serving as both lateral and vertical supports for the teeth.

The rake-head is pivoted to the shafts in such a manner that it can be partially rotated for the purpose of bringing the teeth into position to receive or gather their load, and to dump the same, they being shown in the gathering position in Fig. 4, and in the dumping position in Fig. 5.

For controlling the movements of the rake-head and retaining it in its gathering or dumping position, or at any place between these points, levers are used, the one, H, being pivoted to a bar, L, which is located midway between the shafts of the machine, and to a plate of metal attached thereto. This lever is provided with slots *a* and *b*, so that, as it is moved for the purpose of changing the position of the rake-head, it may change its pivotal points, as shown in Figs. 4 and 5. The lower end of this lever is connected to the rake-head by means of a link or links, I, which are provided with a series of holes, in order that by changing the bolt or pin which connects them to the bracket upon the rake-head the points of the teeth can be thrown farther forward or backward, as may be required, for gathering or dumping different kinds or quantities of material.

To the lever H, the upper end of which is provided with a handle for operating it by the hand, there is attached a rod, H^1, which extends to and is connected with a foot-lever, H^2, the object of which is to enable the operator to control the movements of the rake-head either by the hand-lever or the foot-lever, or both at the same time.

For the purpose of preventing the return of the rake-head and its appendages from the gathering to the dumping position from causing any injurious jar upon the machine, a spring, H^3, is secured to the frame of the machine in such a position as to cause the foot-lever H^2 to come in contact therewith just before the rake-teeth have reached the position in which they are placed for dumping their load, said spring preventing the shock which would otherwise occur.

In order that the load may be readily and certainly removed from the rake when its teeth have been brought into a dumping position, there is pivoted to the rear end of the shafts—and it may be to a bar placed midway between them—an oscillating bar, J, which is supplied with a series of clearing-fingers, J' J', the movements of which, owing to the fact that the points, where they are in line transversely with the rake-teeth, are nearer their pivotal points than the same points in the teeth are to theirs, thus requiring the clearing-fingers to move through a less distance in a given period of time or with a given amount of movement of the lever L', are less rapid than that of the rake-teeth, which insures the timely removal of the load from said teeth, and which are so arranged as to pass between the teeth of the rake, and in dumping the load to assume about the position shown in Fig. 5; but, while the load is being gathered, they will be in substantially the position shown in Fig. 4.

It is apparent that in gathering the load some of the upward pressure of the material will be exerted upon these clearing-fingers, and that to that extent the rake-teeth will be relieved from liability to be sprung upward to such an extent as to allow any part of the material to pass under their lower ends. The oscillating bar J, above alluded to, is connected to the rake-head by means of a link, K, the rear end of which is pivoted to a bracket attached to said bar, and which extends therefrom to, and is connected with, a similar bracket on the rake-head. From this last-named bracket a rod or link, L', extends to, and is connected with, a foot-lever, L'', the lower end of which is pivoted to the cross-bar of the shafts, or to some other suitable part of the machine, so that the operator, by pressing upon the last-named lever, can control the position of the clearing-fingers, and, at the

same time, aid in changing the rake-teeth from their gathering to their dumping positions. It will be observed that this arrangement of the oscillating bar, its clearing-fingers, and its connection with the rake-head and foot-lever will cause the pressure of the material upon the fingers, to aid in dumping the load when the proper time comes, which effect will be produced by removing the foot from the right-hand lever H^2, and allowing the force pressing against the fingers to act upon the rake-head; and, further, that by placing the foot upon the left-lever L″ while the teeth are being returned to their raking position their motion can be regulated and too rapid movement avoided.

It will also be observed that in moving the rake-teeth in either direction the levers H^2 and L″ move in opposite directions, and that, as a consequence, when the rake is being transferred from one field to another, or while it is being turned around, or at any other time, the teeth can be held in any desired position clear of the ground by exerting a small pressure upon both of the foot-levers, and thus all danger of injury be prevented.

For the purpose of adapting the seat O to different persons, it is made adjustable vertically; such adjustability being effected by securing upon a cross-bar of the machine a lug, P, having a projecting pin, *p*, upon its upper surface, which enters apertures formed in the bar O′, which is attached to the under side of the seat, and extends to and passes through a staple, *o*, attached to the cross-bar of the shafts, so that when it becomes necessary to adjust it for a tall person it can be raised and the pin inserted in one of the lower holes; and for a shorter person it can be lowered and held in position by inserting the pin in one of the upper holes.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a horse hay-rake, the combination of the oscillating rake-head or axle C, spindles B, located at each end of the head or axle, ratchet-plates D, and levers D^2, or their equivalents, the parts being constructed and arranged to operate substantially as and for the purpose specified.

2. The hand-lever H, having the slots *a* and *b*, when adjustably connected to an oscillating rake-head, substantially as and for the purpose set forth.

3. The combination of an oscillating rake-head or axle and an oscillating bar, carrying clearing-fingers, which have a simultaneous motion with the teeth of the rake, between which they pass, but which move at a less rate of speed than do said teeth, substantially as and for the purpose set forth.

4. The combination of the oscillating rake-head or axle C, the oscillating bar J, the rod or connections K and L′, with the lever L″, the parts being arranged to operate substantially as and for the purpose set forth.

5. The combination of the oscillating rake-head or axle, the oscillating bar J, the lever L″, connections L′ and K, and the lever H, rod H^1, and lever H^2, the parts being arranged to operate for the purpose of controlling the movements of the rake-head or axle and for retaining them in position, substantially as described.

6. The combination of the oscillating finger-bar J, the rod K, link L′, and lever L″, they being arranged to operate as and for the purpose set forth.

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

WILLIAM S. ARCHER.

Witnesses:
S. CRAIGHEAD,
JOHN A. SHANCK.

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