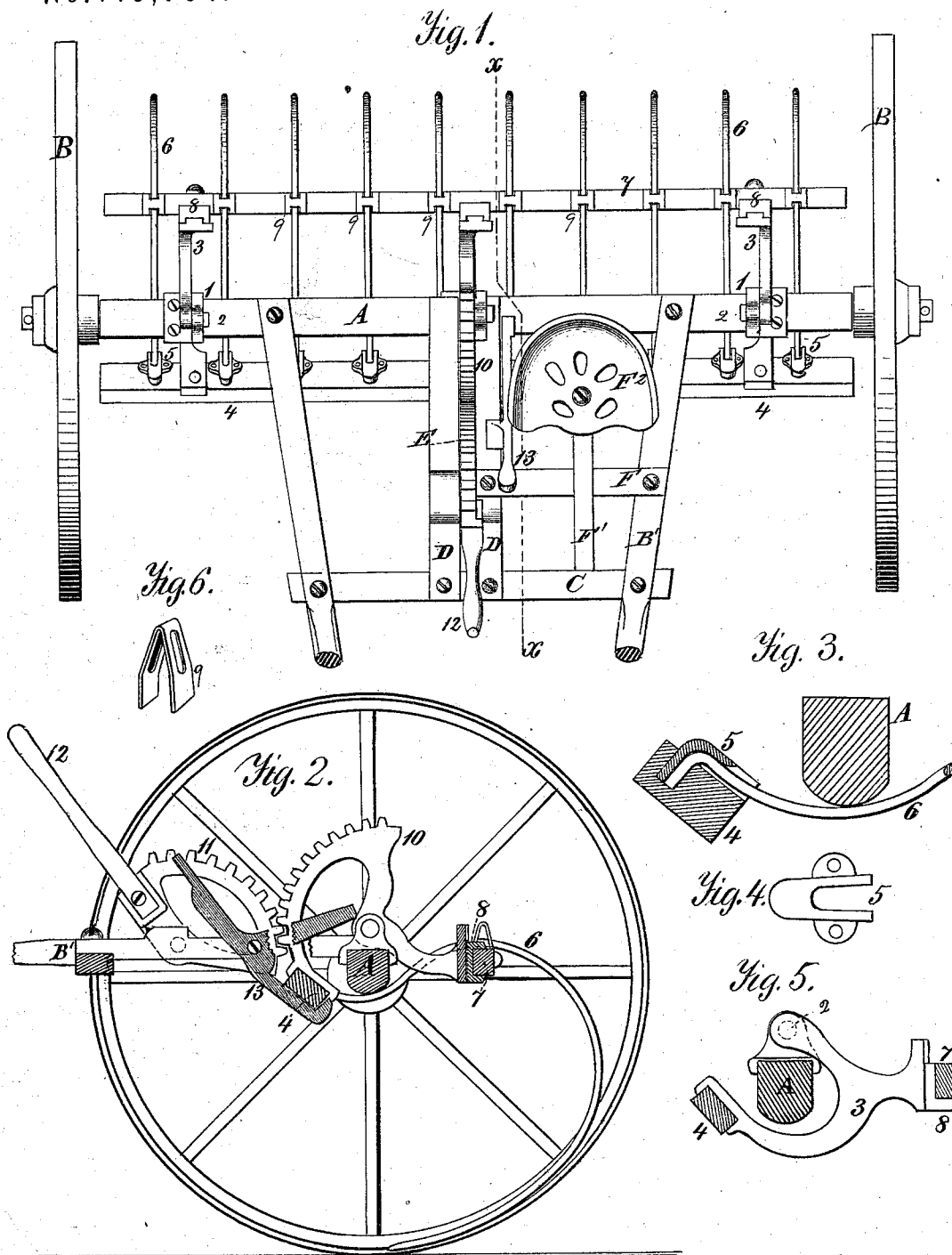


W. S. ARCHER.
Horse Hay-Rakes.

No. 149,704.

Patented April 14, 1874.



Witnesses:
A. Ruppert,
M. B. Johnson.

Inventor:
William S. Archer
by his attys -
Blanchard & Robinson.

UNITED STATES PATENT OFFICE.

WILLIAM S. ARCHER, OF DAYTON, OHIO, ASSIGNOR OF THREE-FOURTHS HIS RIGHT TO CHARLES B. CLEGG, E. MORGAN WOOD, AND GEORGE A. ARCHER, OF SAME PLACE.

IMPROVEMENT IN HORSE HAY-RAKES.

Specification forming part of Letters Patent No. 149,704, dated April 14, 1874; application filed March 5, 1874.

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 Improvements in Horse-Rakes, of which the following is a specification:

This invention relates to improvements in horse-rakes, and consists in certain devices for attaching the swinging or oscillating frame which carries the rake-teeth to the axle; and it further consists in combining, with the swinging or oscillating frame, adjusting devices for the purpose of regulating the position of the lower ends of the teeth with reference to the ground over which the rake passes, and for determining, to some extent, the amount of tension which is put upon the upper or fixed ends of the teeth; and it further consists in the construction of the guides which determine the lateral positions of the teeth; and, lastly, in the construction, combination, and arrangement of certain of the parts of which the machine is composed, all as will be more fully explained hereinafter.

Figure 1 is a plan view of my improved machine, showing the parts in position for gathering its load. Fig. 2 is a transverse vertical section on line *x x* of Fig. 1, showing the parts in position for receiving their load. Fig. 3 is a sectional elevation of the axle, one of the rake-teeth, and of the socket which secures said tooth to the bar of the oscillating frame, said bar being also shown. Fig. 4 is a plan view of the socket above referred to. Fig. 5 is a sectional elevation, showing the bifurcated arm which attaches the oscillating frame to the axle, the method of attaching it thereto, and the fixed and adjustable bars of said frame; and Fig. 6 is a perspective view of the guide for the teeth, which is secured to the adjustable bar of the oscillating frame.

Corresponding letters denote corresponding parts in all of the figures.

In constructing rakes of this character I use an axle, A, of any suitable form and length, to the outer ends of which the carrying-wheels B B are attached in the usual manner, so that they may rotate freely thereon. To the axle A the thills or shafts B' are attached, they

being of such a length as to allow of there being attached to them a cross-bar, C, for holding the forward ends of bars D D, which support the locking device, and the mechanism for operating the oscillating frame, their length forward of said bar being sufficient to allow of their being properly attached to the animal which draws the rake. The bars D D above referred to extend from the axle A to and rest upon the transverse bar C, and serve as supports for the journals of the segmental gear, to which a handle is attached, for a purpose soon to be described. Extending from one of the shafts B' to one of the bars D there is a transverse bar, F, which is so arranged with reference to the bar C as, together with said bar, to form a support for the arm F¹, which carries the driver's seat F², the position and arrangement of said arm and seat being clearly shown in Fig. 1 of the drawing.

The above-referred-to parts may be of any form and material that will adapt them to receive and support the operating parts which may become necessary to attach to them; but, as they, when separately considered, form no part of my present invention, they will not be more particularly described here.

The operating parts of the rake, they being those which constitute in themselves and in their combinations and arrangements the present invention, will now be described.

In order that the hay, grain, and other materials which are to be gathered by this device may be properly collected and delivered in a mass, or, as it is usually termed, in windrows, there are placed upon the axle A, in any suitable positions, brackets or boxes 1 1, which are adapted for the reception of projections 2 2, which are attached to bifurcated arms or levers 3, as shown in Figs. 1 and 5, said arms or levers being so constructed that their upper portion may be attached to the bracket or boxes 1 1 upon the upper surface of the axle A, while their lower portion, when the rake-teeth are in the proper position for gathering their load, may pass under and forward of said axle, their lower portions being longer than their upper ones for that purpose. To the forward ends of the lower and longer por-

tions of the arms or levers 3 a transverse beam, 4, is secured, the outer surfaces of said beam being provided with suitable surfaces for their reception. This beam, when in position, is parallel with the axle A, and to it are attached sockets 5, of peculiar construction, soon to be described, which receive and retain the peculiarly-formed teeth 6 of the rake.

These sockets are of the form shown in Fig. 3, they being provided with flanges, through which screws or bolts pass for securing them to the beam 4, and with a slotted and recessed projection for entering said beam, and for receiving the teeth. This projection may be slotted upon its rear surface, as shown, so as to allow the rear portions of the downwardly-projecting part of the tooth to come in contact with the wood of the beam, as it may have a plate of metal inserted into it in such a way as to form a metallic surface for said downwardly-projecting portion to rest against; in either case it is important that the rear end of that portion which is secured to the beam 4 should be slotted, as shown in Fig. 3, in order that when the lower end of the tooth to which any one of the sockets is attached comes in contact with any obstruction in passing over the ground, said tooth may be allowed to yield or spring in said socket to such an extent as to allow it to come in contact with the axle A, as shown in Fig. 3; and this, to some extent, relieves the strain upon said socket, and at the same time prevents the tooth from being broken in the socket.

The teeth 6 of the rake may be made of round rods of steel, or of any other suitable material, such as hickory, oak, ash, or other kinds of tough wood, steamed and bent into the proper form, the requirements being that they should be sufficiently strong to retain their load, and sufficiently springy not to break when coming in contact with stones or other obstructions when in use.

The peculiar form to be given to these teeth is well shown in Fig. 2 of the drawing, where it will be seen that they are in position for gathering a load, and that that portion thereof which is under the axle is in contact therewith, while their lower ends assume a nearly horizontal position near the ground in consequence of the peculiar curvature given to them. This form of tooth is important, for the reason that it enables the operator to change the lower end thereof from the nearly horizontal position shown in Fig. 2, which is in its best position for gathering its load, to a nearly vertical position, which is the proper one for discharging the same with the least possible amount of movement of the oscillating frame, which carries said teeth, and which consists of the bifurcated arms or levers 3 3, transverse bar 4, and a bar, 7, for adjusting the lower ends of the teeth with reference to the ground, or to their distance therefrom.

The adjustable bar above alluded to consists of a piece of wood or metal attached to the rear ends of the bifurcated arms or levers 3 3,

they being provided with a vertically-extended surface, projecting slightly from the general one, so as to form a guide for a block of metal, 8, which has a recess formed in its inner face to fit upon the projections on the arm or lever, the adjustable bar and the block of metal being attached thereto by screws or bolts in such a manner that they can be moved up or down thereon, as it becomes desirable to cause the lower ends of the teeth to assume a position nearer to or farther from the ground. Upon the adjustable bar 7, and embracing each of the teeth of the rake, there is placed a double slotted guide, 9, its peculiar construction being shown in Fig. 6, where it is represented as adapted to span the bar 7, and to form a double support laterally for the teeth. This guide may be made of sheet or cast metal, or of wood, its peculiar form of construction being designed to form a more perfect support against the lateral movement of the teeth, by presenting two surfaces for them to bear against. The slots in these guides are to be of such a length as to form a stop for the teeth after they have come in contact with the axle, so that any binding which takes place after the teeth have been forced upward to the upper surface of the slots shall be between that point and their outer ends. In order that the oscillating frame, above alluded to, and its teeth may be properly manipulated by the person in attendance, there is attached to the front beam, 4, of said frame a segmental gear, 10, which has upon its periphery a segmental surface provided with cogs, the lower end of said cogged or toothed portion being attached to the beam, while from its rear portion there extends an arm, to which the adjustable beam 7 is attached. The toothed portion of this gear is of such form that when it and the teeth of the rake are in the positions shown in Fig. 2 the leverage of the other segmental gear, 11, upon it will be long, but will regularly decrease as the lever 12 is turned from the position shown in said figure toward the one in which it is placed for discharging its load, as a consequence of which the labor required of the operator to discharge the load from the rake will be slight, as when the parts are in the positions shown in Fig. 1 the leverage of the gear 10 upon the one marked 11 is slight, and only a slight pressure upon the handle 12 will be required to keep the parts in that position until a load has been accumulated. When that result has been accomplished the operator has only to release the lever of the pressure which he had previously been putting upon it, and the resistance offered by the load will cause the beam 4 to swing first downward and then backward in the segment of a circle, and will thus aid in carrying the parts into a position to discharge the contents. As the beam 4 starts from the position shown in Fig. 2 the resistance offered by the load has the effect to oscillate the frame, such effect being a constantly-increasing one from the time it leaves such position until the beam

4 has been carried back past a line drawn vertically through the axle A, at which time a slight pressure put upon the handle 12 of gear 11 will carry the teeth of the rake into the position required to enable them to discharge their load, this being easily effected on account of the form of the gears 10 and 11, which, as represented in Fig. 2, is such as to increase the leverage upon the oscillating frame at that time; and thus, as will be seen, when the resistance upon the teeth of the rake begins to diminish, in consequence of the fact that the beam 4 has been carried to the rear of its pivoted point, and in rising in the rear thereof, the leverage of the gears is increased as a consequence of their particular form, and the load is discharged with the expenditure of the minimum of power. Should it be desirable to lock the oscillating frame in position when the rake is gathering its load, the dog 13, (shown in Figs. 1 and 2,) which is pivoted to one of the bars D, may be brought into requisition by pressing forward its upper end, and thus causing its lower end to catch upon the beam 4, which will hold the teeth in the position shown in Fig. 2, and when it is desirable to release the oscillating frame from its control it is only necessary to press backward upon its upper end, and, as above stated, the resistance offered by the load will start the frame toward the position which it is to occupy when it discharges said load. Another use to which this dog is applied is to hold the oscillating frame in such a position as to leave the lower ends of the teeth at the required distance from the ground, when the machine is being moved from one field to another, by allowing the front side of the beam 4 to come in contact with its lower beveled end, when its upper end is thrown forward to its full extent.

Having thus described my invention, what

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

1. The oscillating frame which carries the rake-teeth, hinged to the axle by means of bifurcated arms or levers, curved so as to bring the rake-head beneath and forward of the axle when the teeth are in their raking position, substantially as described, and for the purpose set forth.

2. The guide-bar 7, adjustable on its supporting-arm, in combination with the bifurcated arms or levers 3, sliding blocks 8, the fixed bar 4, and the teeth 6, the parts being arranged to operate substantially as and for the purpose set forth.

3. The double slotted guide 9, when made to span the adjustable bar 7, and thus form a double support against the lateral movement of the teeth at that point.

4. The socket 5, when constructed in elbow form, and with a slot in its upper surface, through or into which a portion of the tooth may pass when its lower end meets with any unusual obstruction, and a groove in its lower surface, substantially as and for the purpose set forth.

5. The arrangement of the teeth of the rake in the oscillating frame, and with reference to the axle of the machine, whereby said teeth are made to bear against said axle, and are thus prevented from being broken.

6. The combination, in a horse-rake, of an oscillating frame, constructed and arranged substantially as herein described, and segmental gears having a greater amount of leverage at one of their terminal points than at the other, substantially as and for the purpose set forth.

Witnesses: WILLIAM S. ARCHER.

B. PICKERING,

W. H. CLARK.