(No Model.)

F. BENTEL.

HORSE HAY RAKE.

No. 353,397. Patented Nov. 30, 1886.

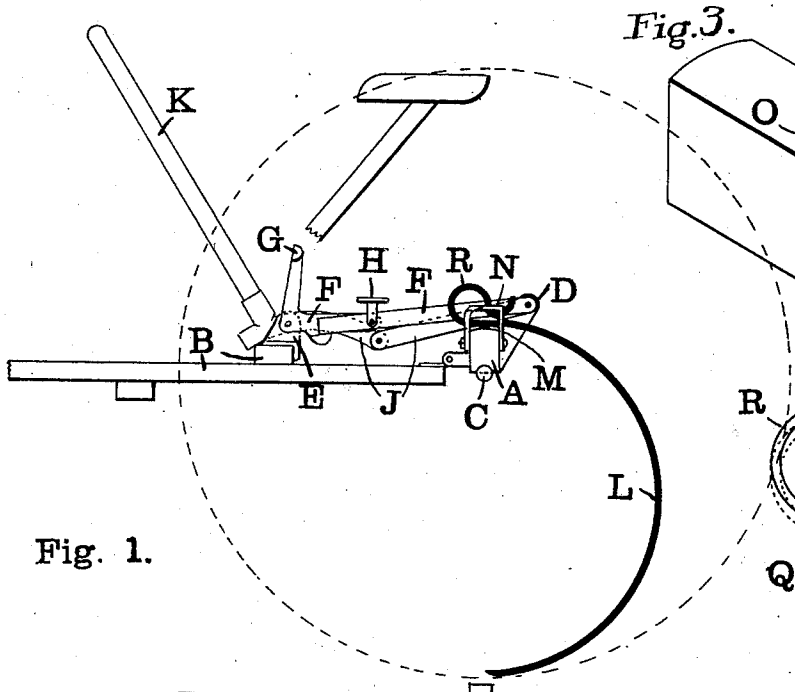
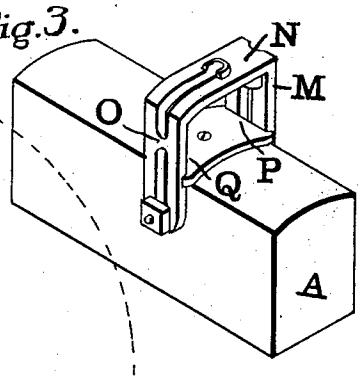


Fig. 1.

Fig. 3.



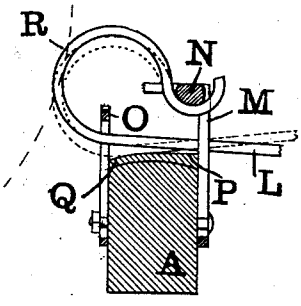


Fig. 4

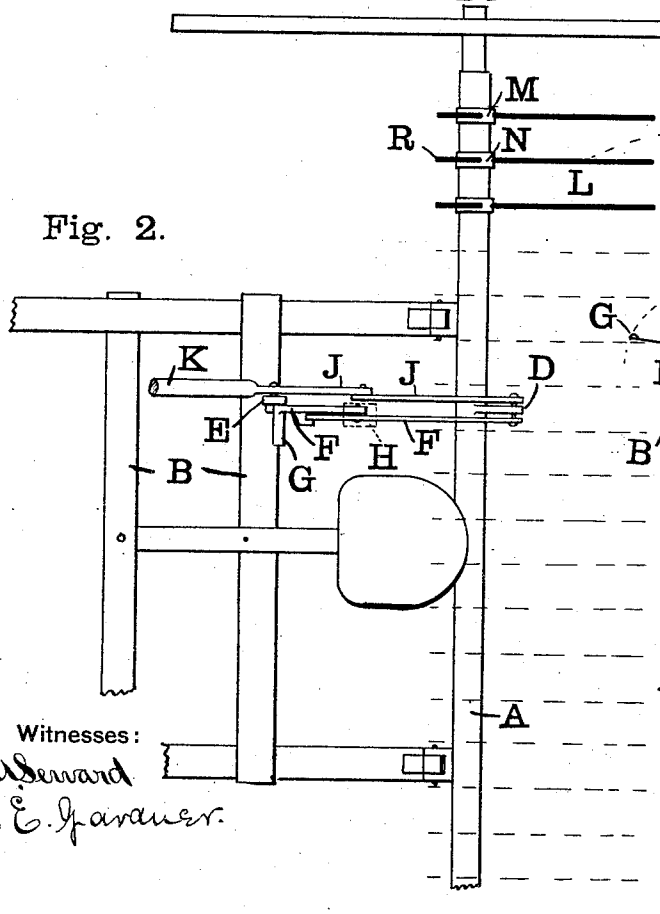


Fig. 2.

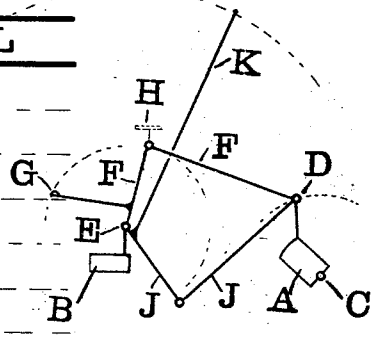


Fig. 5.

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UNITED STATES PATENT OFFICE.

FREDERICK BENTEL, OF HAMILTON, OHIO, ASSIGNOR TO JOHN W. SOHN, OF SAME PLACE.

HORSE HAY-RAKE.

SPECIFICATION forming part of Letters Patent No. 353,397, dated November 30, 1886.

Application filed November 30, 1885. Serial No. 184,262. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK BENTEL, of Hamilton, Butler county, Ohio, have invented certain new and useful Improvements in Horse Hay-Rakes, of which the following is a specification.

This invention pertains to horse hay-rakes of the hand-dumping class; and the improvements relate to various features of construction, as will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a side elevation of my improved rake; Fig. 2, a plan illustrating the main portions of the same; Fig. 3, a perspective view of a portion of the rake-head, exhibiting one of the tooth-holders; Fig. 4, a transverse section of the rake-head at one of the tooth-holders, and Fig. 5 a diagram illustrating the action of the toggles.

In the drawings, A indicates the rocking rake-head, the same consisting, as usual, of a piece of timber provided with stub-axles at each end for the rake-wheels; B, the usual shaft-frame, hinged at its rear end to the rake-head in the usual manner; C, the axle of the rake-wheels, upon which the rake-head rocks; D, the usual short arm projecting upwardly and rearwardly from the rake-head, for the attachment of the dumping-toggle; E, the usual pivot-bearing supported by the frame parts, for the attachment of the fixed end of the dumping-toggle; F, a pair of connected toggle-links reaching from the arm to the pivot-support, and arranged, as usual, so that its intermediate pivot will pass a trifle below the neutral line of action when the rake-head is in raking position; G, a foot-lever formed by an upward projection from the forward one of the links referred to, such foot-lever operating in the usual manner in dumping the rake; H, a foot-pad rising from the intermediate pivot of the toggle F, such pad serving in depressing the toggle; J, a second pair of connected toggle-links reaching from the arm to the pivot-support, and arranged to move downward at their connected ends when the toggle F rises in the act of dumping the rake, these toggle-links being of such length that their central pivot lies a trifle below the neutral line when the rake-head is in raking position; K, a hand-lever attached to the forward one of the links J; L, the usual rank of curved rake-teeth, formed of large spring wire; M, the tooth-holders, consisting of slotted arches, one for each tooth, straddling the rake-head and secured thereto by bolts through slots in the arches; N, an unslotted portion of each tooth-holder, engaged pivot-like by a hook at the upper end of the rake-tooth, this tooth-pivot being disposed at the rear upper corner of the arch; O, an unslotted portion at the front of the arch, the same being disposed over the portion of the tooth-wire which passes through the front of the arch; P, the rear upper surface of a saddle, secured one within each arch to the top of the rake-head; Q, the front upper surface of such saddle, and R a bow in that portion of the tooth between the hooked engagement and the point passing under the part O.

By means of the toggle-links F and the foot-lever G the driver may dump the rake by pressing forward upon the foot-lever, the intermediate pivot of these links rising as the rake dumps. When the rake is in raking position, the intermediate pivot of this toggle lies slightly below the neutral line, thereby forming a lock which prevents the raking strain upon the teeth from tipping the rake-head. When the rake is dumped, the teeth will descend of their own weight at least far enough to bring the central pivot of the toggle referred to into the neutral line. The foot may then be placed upon the foot-pad H and the toggle pressed into the raking position. The foot-pad at the intermediate pivot or toggle has heretofore been used in rakes; but it has been adapted only to aid in the actual dumping operation—that is, the foot-pad has been arranged in connection with a toggle whose intermediate pivot was to be forced down by foot-power in the act of dumping.

A toggle provided with a foot-lever and arranged to have its intermediate pivot rise as the dumping takes place, and provided with a foot-pad upon the intermediate pivot to serve in locking the toggle, is new, so far as I know.

The foot of a weak driver is sometimes not sufficient to perform the dumping operation.

I therefore provide the second toggle system, J, having hand-lever K so arranged that the dumping is effected by a rearward pull of the hand-lever, the intermediate pivot of the toggle J descending as the dumping takes place. The locking system just referred to is not applicable directly to a toggle system arranged in the latter manner; but by the combination of the two systems the first toggle furnishes the second toggle with the lock, the office of the foot operating-lever G being simply to disengage the lock. The central pivot of the toggle J never rises beyond the neutral line, and consequently the toggle J, while always available for dumping purposes, is never in interference with the action of the toggle F when the rake is to be dumped by foot.

The combination of the two oppositely-acting toggles, one having a locking function, and the other not having a locking function, the two arranged to act in the manner described, is entirely new, so far as I am advised.

In some rakes of this class now under consideration the points of the rake-teeth are incapable of any motion except such as results from their flexibility and from the dumping action. In other rakes of the same class the teeth are pivotally attached to the rake-head, so as to be capable of a limited oscillating motion, whereby the points of the teeth may individually retreat a few inches in passing obstructions, and this without bringing any elastic strain upon the rake-teeth. This capacity of the teeth for a slight free oscillation is termed the "drop" of the teeth. Some rakes have their teeth arranged to have a drop of unalterable degree, while in some other rakes the amount of the drop is adjustable.

My tooth-holding system presents a novel means for securing the teeth to the rake head and for adjusting the amount of drop. Each tooth is secured to the rake-head by means of a slotted arch, M. These arches are simply slotted strap-like castings which straddle the rake-head and are bolted thereto. The arches may be raised or lowered upon the rake-head, and may be secured. The tooth is hooked under the pivot N, and the weight of the tooth is supported by contact at the point P. The tooth is capable of oscillating upon the pivot N, and the oscillating movement is limited by the contact at the point Q between the tooth and the saddle on which it rests. These saddles, by the way, are merely metal plates secured upon the top of the rake-head with the arches. They prevent the wearing and bruising of the top of the rake-head by the teeth, but are not at all essential. The front portions of the arches serve to steady the teeth sidewise and to hold them at right angles to the rake-head, and also serve to adjust the abutments O, beneath which the rake teeth pass. The front and rear portions of the arch, instead of being connected or formed in one piece, as shown in Fig. 3, will perform their functions if entirely separate, as will be understood from Fig. 4, in which I have shown the rear upper corner of the arch as being broken away, thus leaving the front and rear uprights in separate pieces. Convenience of adjustment and cheapness of construction have suggested that the arch be integrally formed. The "dropping" action of the teeth will be understood from Fig. 4, in which the normal position of the upper portion of the teeth is indicated in full lines, while the dotted lines show the position taken under the action of the drop. If the bolt which holds these arches be loosened and the arch pressed downward, it is obvious that the teeth can be put into the position indicated by the dotted lines—a position corresponding with the exhaustion of the dropping movement. It follows that the amount of the drop may be adjusted from zero to the maximum. It is obvious that the arch may be bolted to the rake-head in an inadjustable manner by omitting the slots which engage the securing-bolt. This would deprive the rake of its quality of having its drop adjustable; but the tooth-holders would otherwise perform their full functions.

It is obvious that the more the hook at the top of the tooth is depressed the greater the pressure holding the tooth in normal raking position. This depression can be adjusted to suit the preference of the user. The tooth may play with no pressure or with light pressure; or it may be deprived entirely of its play or drop and put under greater or less pressure. Depressing the arch increases the tension of bow-spring R, which serves as a spring in holding the tooth to its work. When the arch is so far depressed that the hook makes contact with that portion of the tooth just below the hook, then the spring function falls entirely upon the balance of the tooth's length. The bow thus serves the purpose of an added spring. The arch may be adjusted so low down as to cause the hook to make contact with that portion of the tooth just below the hook, and at the same time bring the abutment O down tight upon the forward lower portion of the bow, thus practically suppressing the spring function of the bow entirely.

I claim as my invention—

1. A rocking rake-head with its rank of teeth, a shaft-frame articulated thereto, a pivot-support secured to the shaft-frame, an arm secured to the rake-head, a pair of connected toggle-links reaching from said arm to said pivot-support and arranged to have their connecting central pivot occupy a position below the neutral line when the rake-head is in raking position, a foot-lever attached to the forward one of said links, and adapted, when pushed in a direction away from the rake-head, to elevate the toggle-center, and a foot-pad pivoted to the intermediate pivot of the toggle, combined substantially as and for the purpose set forth.

2. A rocking rake-head with its rank of teeth, an arm projecting therefrom, a shaft-frame articulated to the rake-head, a pivot-support upon the shaft-frame, a pair of tog-

gle-links reaching from said arm to said pivot-support, and arranged to have their intermediate pivot descend when the rake is dumped and to occupy a position below the neutral line when the rake-head is in normal position, a hand-lever connected with the forward link of said toggle, and adapted, when pulled in a direction toward the rake-head, to depress said toggle and dump the rake, a second pair of toggle-links engaging said arm and pivot-support, and adapted to have their intermediate pivot rise as the rake is dumped and to occupy a position below the neutral line when the rake-head is in normal position, and thus form a lock to prevent the rising of the intermediate pivot when the rake is at work, and a foot-lever connected with the forward one of said last-mentioned toggle-links, and adapted, when pressed in a direction forward from the rake-head, to elevate said last-mentioned toggle and dump the rake, combined substantially as and for the purpose set forth.

3. A rake-head, an arch-piece for each rake-tooth, secured to the rake-head and carrying a tooth-pivot above the rake-head, a rake-tooth hooking under said tooth-pivot and projecting forwardly in bow form, and then rearwardly under the hooked portion and over the rake-head, and a contact-support on the rake-head for the bow forward of said tooth-pivot, combined substantially as and for the purpose set forth.

4. A rake-head, a tooth-pivot secured over the front thereof by means of a bolt engaging a slot, and a rake-tooth hooked into engagement with such pivot and passing forwardly in bow form, and then rearwardly under the hooked portion and over the rake-head, combined substantially as and for the purpose set forth.

5. A rake-head, a slotted arch-piece straddling the rake-head and bolted thereto, and carrying a tooth-pivot, and a tooth hooked to said pivot and projecting forwardly in bow form out through said arch, and then into the arch again over a contact-support on the rake-head in advance of the tooth-pivot, and rearwardly out under the hooked portion and over the rake-head, combined substantially as and for the purpose set forth.

FREDERICK BENTEL.

Witnesses:
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