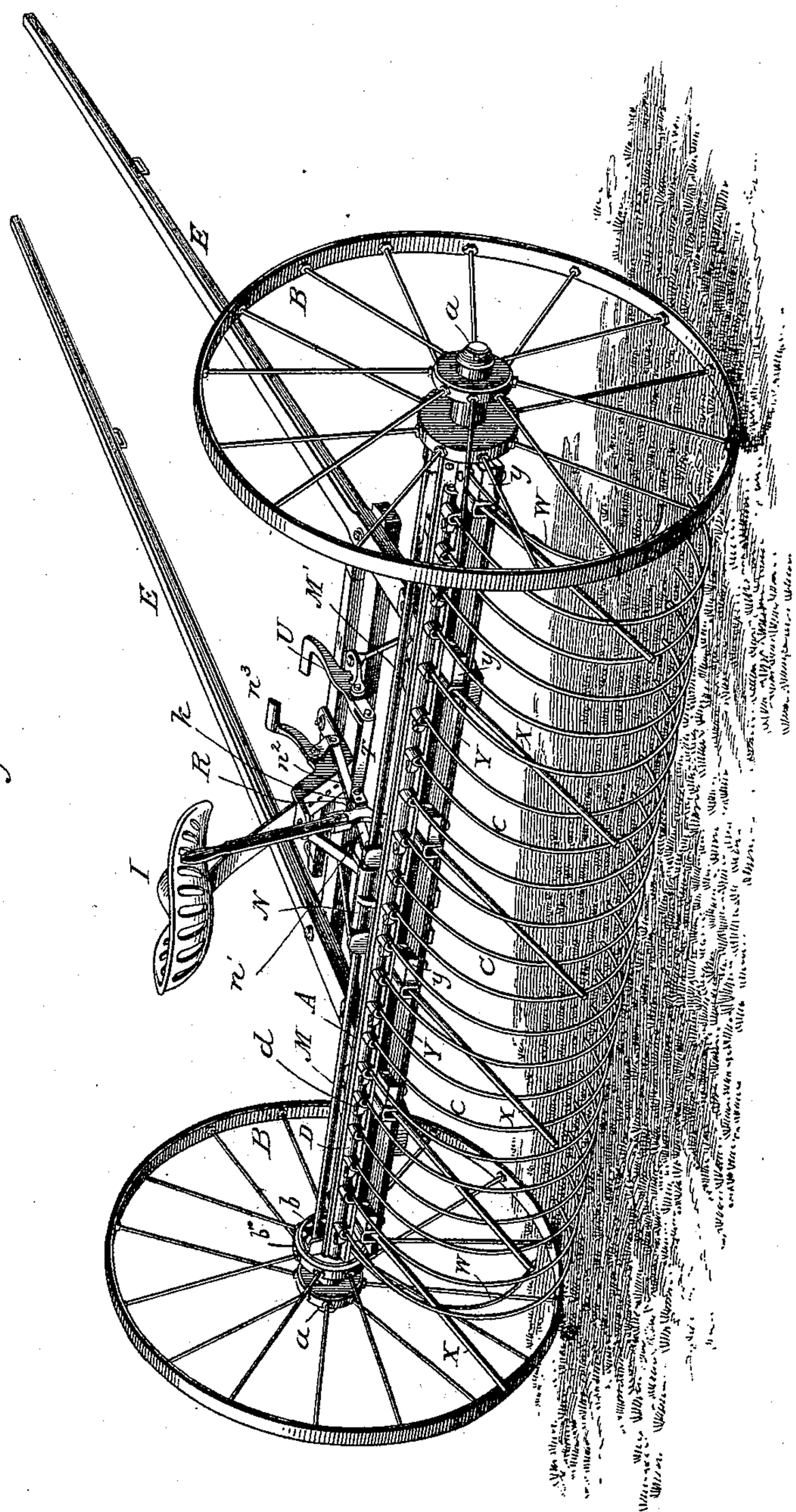
(No Model.) 2 Sheets—Sheet 1.

C. S. SHARP.

HORSE RAKE.

No. 517,490. Patented Apr. 3, 1894.

Fig. 1.



Witnesses
Raymond B. Barnes.
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Inventor
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By his Attorney P. T. Dodge

THE NATIONAL LITHOGRAPHING COMPANY,
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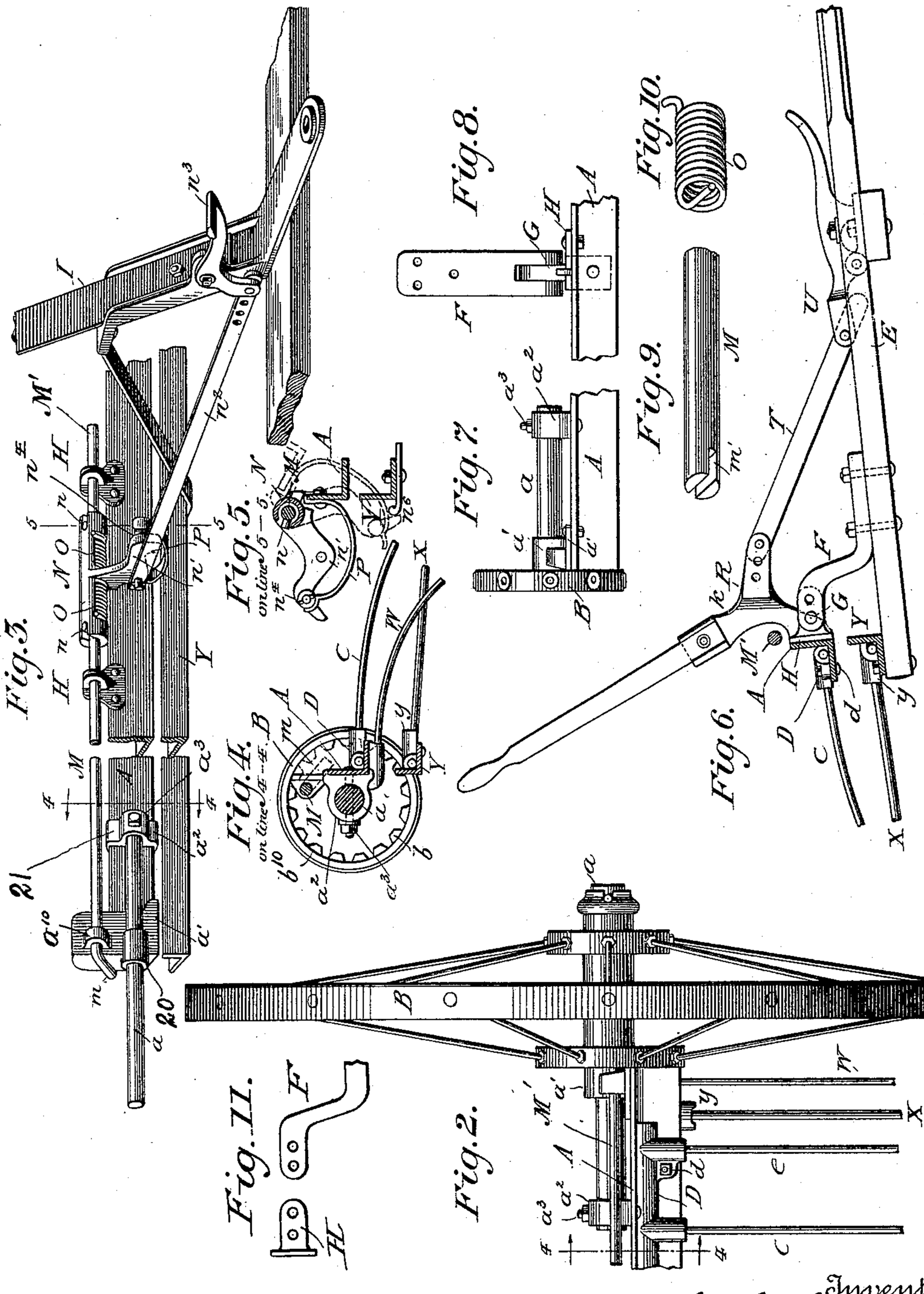

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UNITED STATES PATENT OFFICE.

CHARLES S. SHARP, OF AUBURN, NEW YORK, ASSIGNOR TO THE D. M. OSBORNE & COMPANY, OF SAME PLACE.

HORSE-RAKE.

SPECIFICATION forming part of Letters Patent No. 517,490, dated April 3, 1894.

Application filed January 25, 1892. Serial No. 419,208. (No model.)

To all whom it may concern:

Be it known that I, CHARLES S. SHARP, of Auburn, county of Cayuga, and State of New York, have invented a new and useful Improvement in Horse-Rakes, of which the following is a specification.

This invention has reference to what are commonly called "self-dumping" hay-rakes, in which a rocking or rolling head provided with a series of spring teeth is carried by a wheeled axle, and combined with mechanism for connecting the head with the wheels in order to raise the teeth automatically from the ground and then release them when they have reached a suitable elevation.

The invention has reference to various improvements in the construction of the frame, the clutching mechanism, the automatic releasing devices, and the manual devices for raising, lowering and holding the teeth.

In the accompanying drawings,—Figure 1 is a perspective view of the rake complete. Fig. 2 is a top plan view of one end of the same. Fig. 3 is a perspective view of a portion of the axle and adjacent parts, the wheel being removed and other parts omitted. Fig. 4 is a vertical cross-section on the line 4—4 of Figs. 2 and 3, looking in the direction indicated by the arrow. Fig. 5 is a vertical cross-section of the rake-head and axle, on the line 5—5 of Fig. 3, showing more particularly the means for throwing the driving devices into action. Fig. 6 is a vertical cross-section from front to rear through the rake, looking toward the hand-lever by which the head is controlled. Fig. 7 is a top plan view of one end of the axle and the parts attached thereto. Fig. 8 is a top plan view showing the draft connections with the axle, shown in part also in Fig. 6. Figs. 9 and 10 are views of details hereinafter explained. Fig. 11 is a detail showing the variable connection hereinafter described.

Referring to the drawings A represents the axle serving also as the rake head consisting of a continuous bar of rolled steel or iron of L-form in cross section. Metallic end pieces or castings a' are secured to each end of said axle A. These end pieces a', each consist of two perpendicular portions or walls, arranged at right angles with relation to each other, and rising at right angles from a horizontal portion or wall, thereby forming three-sided end pieces which receive the ends of the axle A; and a forwardly projecting lug 20, is formed integral with each end piece having a transverse hole through it, which receives the wheel journal a, at a point about midway between its ends. The end pieces a' have also formed integral therewith forwardly projecting lugs a^{12}, provided with transverse holes through them for purposes to be hereinafter described.

Castings a^2, made as rectangular blocks having forwardly projecting lugs 21, which receive the inner ends of the wheel journals, are secured to the vertical portions of the axle A. Each block a^2 has a horizontal flange at top and bottom to engage the upper and lower edges of the axle, and as a means of securing the blocks to the axle, a bolt a^3 passes through each lug 21, and the inner end of each wheel journal, and also through the vertical portion of the axle, thereby firmly securing the parts together. The end pieces with the flanged blocks a^2, securely hold the wheel journals in line with the axle under all ordinary conditions. The ground wheels B, are mounted upon said wheel journals a. The horizontal flange of the axle is extended rearward at the lower edge and serves to receive and carry the upper ends of the curved spring teeth C, which are secured thereto by overlying plates D, held in place by bolts d. Each tooth has its forward end bent laterally to serve as a journal. The overlying plates D, are grooved in their under sides and are adapted to cover and confine these journals, the grooves increasing in depth toward the rear in order to permit the teeth to rise and fall independently while preventing their lateral motion. Thus it is that as the axle is carried forward the points of the teeth are drawn over the ground in parallel lines, while at the same time, they are permitted an independent rising and falling action as in other rakes.

The rake is drawn forward by means of thills or shafts E E, connected by the usual cross-bar provided with a singletree. Each thill has its end projected rearward below the axle, as shown in Fig. 6, and provided on the

upper side with an uprising draft arm F, bolted rigidly thereto and connected at the rear end by a horizontal pivot-bolt G, to a lug or casting H, bolted firmly to the front of the axle. Upon the thills is mounted, as usual, a transverse seat I, so that the weight of the driver carried by the thill connections or pivots G, forward of the axle, tends to rotate the latter and lift the teeth, the weight of the rider being thus brought into play to counterbalance the teeth and their load, so that an easy rising and falling motion is secured.

The draft arms F and the castings H, are each provided, it will be seen, with two bolt-holes, one forward of the other, thus allowing the pivot-bolt to be shifted forward and backward to a greater or less distance from the axis of the rake-head so that the weight of the rider is applied with more or less leverage or advantage. In this way the machine may be adjusted so that a light or a heavy rider may properly counterbalance the teeth.

The advantage of using two holes in the part F, as well as in the part H, lies in the fact that the pivotal points may be changed without changing the relation of the draft devices or their connections to the rake-head. This is important in view of the fact that the automatic clutch and trip devices are mounted in part on the axle and in part on the thills, so that any change in the relation of the parts would disturb the action of said devices.

For the purpose of automatically turning the axle in a forward direction each of the ground wheels B is provided at the inner end of its hub with an annular flange b^{10} having internal teeth b, as shown in Fig. 4. Lengthwise of the axle and extending in opposite directions from its middle, are mounted two rock-shafts M and M′, each passed at the outer end through a supporting lug a^{10} and then bent at a right-angle so as to form a dog or pawl m, Figs. 3 and 4, which lies within the annular flange b^{10} and is adapted to engage with the teeth of the adjacent hub when the shaft is rocked. When the pawl is thus engaged the axle is compelled to revolve in a forward direction with the wheels, and the teeth are raised from the ground to discharge the accumulated hay. It will be seen in Fig. 4, that the dog m extends rearward to engage the teeth, and that when in action the strain is applied in the direction of the length of the dog, and received directly by the casting bolted to the axle, so that there is no liability of the parts to break, disengage or wear out of shape. The inner ends of the two rock-shafts are slotted transversely, as shown at m', Fig. 9, and are thrust into sleeves formed in opposite ends of a casting N. In each end of this casting there is inserted a coiled spring O, such as shown in Fig. 10, having one end bent transversely to enter the slot in the adjacent rock-shaft and the opposite end shaped to interlock with the sleeve N. When the sleeve is turned forward it acts through the springs to turn the two shafts and engage their outer ends with the wheels, but in the event of either wheel turning slower than the other, or of its being turned backward in turning the machine the spring will yield and allow the rock-shaft to turn so that the dog on its end may slip past the tooth in the wheel. In this way breakage of the parts is prevented. The rockshaft has an independent rotation limited by a pin or stud n, projecting therefrom into a slot in the sleeve N, so that when the sleeve is turned backward it acts through these studs to positively turn the rock-shafts and throw the dogs out of engagement with the wheels.

In order that the operator occupying the seat may conveniently control the sleeved casting so as to throw the dogs into and out of action, it is provided with a rigid forwardly extending arm n', connected by a pivot to a bar n^2, extended forward and connected at its front to one end of an angular foot-lever n^3, fixed to the seat standard or other support. When this lever is depressed by the foot it acts through the intermediate parts to turn the sleeve and the connected rock-shafts so that their dogs will engage the wheels.

As the rock-shaft, the sleeve N and its arm all turn forward with its axle, provision must be made for holding the parts in operative position until the lifting of the teeth is completed. This is effected by securing to the axle, as shown in Figs. 3 and 5, a strong spring-arm P, lying adjacent to the arm n', of the sleeve, and having one end bent into angular form and arranged to bear against a roller n^4, on the side of said arm. When the foot-lever is moved to throw the lifting devices into action the roller n^4, is carried past the angle of the spring from the position shown in full lines in Fig. 5 to the position shown in dotted lines, so that the spring then acts to retain the parts in their adjusted positions. The several parts retain their relations until the axle is turned a sufficient distance to effect the discharge of the hay, at which moment the forward end of the arm n', encounters a stationary underlying stop n^6, so that the arm is held at rest while the other parts continue to turn, the effect of which is to rotate the rock-shafts and throw their pawls out of engagement, at the same time carrying the roller n^4, past the angle of the spring to its original position so that the spring acts to keep the pawls out of action.

From the foregoing it will be perceived that the operator has only to apply a momentary pressure to the foot-lever after which the parts operate automatically.

It is desirable at times for the operator to hold the teeth down in their operative positions, to lift them by hand or to hold them in an elevated position as circumstances may demand. For this purpose a forwardly-extending arm k, having a hand-lever fixed thereto is bolted rigidly to the axle within convenient reach of the operator, who is en-

abled by grasping the lever to positively turn or hold the axle and teeth. A bar T is connected by a pivot pin to the forward end of the arm R, which is extended forward and pivoted at its front to the rear extremity of a foot-lever U, which latter is pivoted midway of its length in a bearing-plate on the draft-frame. When the teeth are down and their parts in their normal position, as shown in Fig. 6, the pivotal connection between the arm T, and lever U, stands in such position that a forward or downward pressure on the foot-lever serves to hold the teeth down. As the hand-lever and axle are turned forward to lift the teeth, the end of the bar R, falls below the center and the action of the lever is reversed.

In rakes as ordinarily constructed much difficulty is experienced by reason of the accumulated hay working outward at the ends against the spokes of the wheels with which it becomes entangled and by which the mass is frequently given an objectionable rotary motion within the teeth. To overcome this difficulty there is provided at each end of the machine an extra rake-tooth W, smaller or shorter than the remainder. It lies close to the inner side of the wheel with its point a few inches above the ground and its body somewhat forward of the main teeth. These supplemental or guard teeth, clearly shown in Figs. 1 and 4, may be attached to the rake-head in any suitable manner. It is found that they answer an excellent purpose when seated, as shown in Fig. 4, firmly in the end castings a', of the axle.

For the purpose of removing the hay from the teeth as they rise, and to prevent the mass from acquiring the familiar and objectionable rolling motion within the teeth, a series of gravitating stripper arms X, is employed located at suitable intervals in the width of the machine and projecting rearward between and beyond the rake teeth. These clearer arms are supported by a metal bar of L-form in cross-section lying beneath the axle and bolted to the rear ends of the thills, as shown in Fig. 6. The clearer arms, preferably of metal, are bent laterally at their forward ends to form journals, and are held on the upper surface of the bar Y, and secured in place by clip-plates y, similar to those employed for retaining the rake teeth, as shown in Fig. 4. It is to be noted that each of the clearer arms is free to rise and fall independently of the others.

While there is described herein the preferred spring connections between the rock shafts M M', and the devices for turning the same, it is to be understood that the combination of the rock shafts turning on axes in parallelism with the axis of the rake head, and carrying clutch dogs or pawls, with an operating device for positively moving them, and a spring or springs interposed between said rock shafts and the positively moving operating device so that the shafts may turn independently, is broadly claimed.

Having thus described my invention, what I claim is—

1. In a horse rake, the combination of a rolling rake head consisting of the metallic L-shaped bar A and rake teeth loosely connected to the horizontal portion of said bar by clips D, metallic end pieces secured to the ends of said bar, having forwardly projecting lugs 20, with transverse holes through them, wheel journals a embraced at points midway between their ends by said lugs, supporting wheels thereon having internally toothed hubs, rock shafts M, M', arranged in alignment and turning on an axis in parallelism with the axis of the rake head, having their outer ends projecting into the internally toothed hubs, and bent at right angles to form pawls adapted to cooperate therewith, bearings for said rock-shafts secured to the vertical portions of said bar A, an intermediate connection between the inner ends of said rock shafts, to which they are flexibly connected, a foot lever connected with and adapted to operate said rock shafts, and tripping mechanism for the rolling rake head constructed and arranged to operate when the rake teeth have been raised a predetermined distance, substantially as described.

2. In a horse rake, the rolling rake head consisting of a metallic L-shaped bar A, and rake teeth pivotally connected to the horizontal portion thereof by clips D, metallic end pieces secured to each end of said bar having forwardly projecting lugs 20, wheel journals a embraced at points midway between their ends by said lugs 20, rock shafts M, M', arranged in alignment and turning on an axis in parallelism with the axis of the rake head, and bearings for said rock shafts secured to the vertical portions of the bar A, an intermediate connection between the inner ends of said rock shafts to which they are flexibly connected, a foot lever connected therewith, right angular pawls formed integral with the outer ends of said rock shafts and contained within and adapted to cooperate with internally toothed hubs upon the supporting wheels mounted on the journals a, a draft frame, a metallic L-shaped stripper bar Y supported thereby, strippers secured to the horizontal portions thereof by clips y, and tripping mechanism for the rolling rake head comprising an extension borne by the rake head, and a fixed stop on the stripper bar, for tripping said rake head when the rake teeth have been raised a predetermined distance, substantially as described.

3. In a horse rake, the rolling axle provided with wheel journals, wheels mounted on said journals and having hubs with internal teeth, the two rock shafts journaled in the bearings on the axle in line with each other and having at their outer ends dogs or pawls adapted to engage the teeth of the wheel hubs, means

for rocking said shafts to throw the dogs into engagement with the said teeth, and a yielding spring connection for the inner end of said shafts which permit a slight independent movement of the shafts relatively to each other.

4. In a horse rake, the combination of the axle and its supporting wheels, two rock shafts mounted in bearings on the axle and carrying dogs or pawls at their outer ends adapted to engage the respective wheels, and a spring connected between said shafts to permit one of said dogs or pawls to yield when the wheels turn in opposite directions.

5. In a horse rake and in combination with the rock shafts M, M′, carrying dogs to engage the wheels, the intermediate member N having sockets to receive the shafts and springs seated therein as shown and connected at one end with the shafts, and at the other end with the member N and means for turning the member N.

6. In a horse rake and in combination with the rock shafts carrying dogs to engage the wheels, the intermediate socketed member N, the springs connecting the same with the rock shafts, and stops n to limit the independent motion of the shafts.

7. In a horse rake, the rolling axle, its rake teeth and the supporting wheels in combination with the draft frame provided with a driver's seat, the arms F fixed to the draft frame and provided with a plurality of pivot holes, and the bearing plates H fixed to the axle and provided with a corresponding number of pivot holes, and pivots movable as described, whereby the leverage of the driver's weight upon the axle may be increased or diminished without changing the relation between the axle and the draft frame.

8. In a horse rake, the combination of the rolling axle carrying the rake teeth, a supporting wheel, a rock shaft mounted in bearings on the axle and carrying a dog or pawl adapted to engage said wheel, the arm n' for turning said shaft having laterally projecting pin n^4, and the spring P, secured at one end to the axle the opposite end being formed to cooperate with the pin n^4, and hold the parts in operative position, the foot lever connected with said arm, and a limiting stop for limiting the movement of said arm, and disengaging the pin n^4, from the angular formation of the spring P.

9. In a horse rake, wheel supporting axles and wheels thereon, a rolling tooth carrying rake head, a ratchet toothed hub turning in unison with one of said supporting wheels, a rock-shaft bearing a pawl at its outer end, to engage the ratchet teeth, and a spring acting upon said pawl carrying shaft, to resist its backward rotation, yet permit it to yield as the pawl slips over the teeth of the ratchet, a block connected with said rock shaft, against which one end of said spring bears, an operating lever and intermediate connections between said operating lever and block, substantially as described.

In testimony whereof I hereunto set my hand, this 6th day of January, 1892, in the presence of two attesting witnesses.

CHARLES S. SHARP.

Witnesses:
C. F. BALDWIN,
C. E. ALMY.