2 Sheets—Sheet 1.

W. H. BUTTERWORTH.

Hay Tedder.

No. 111,041. Patented Jan. 17, 1871.

Fig. 1,

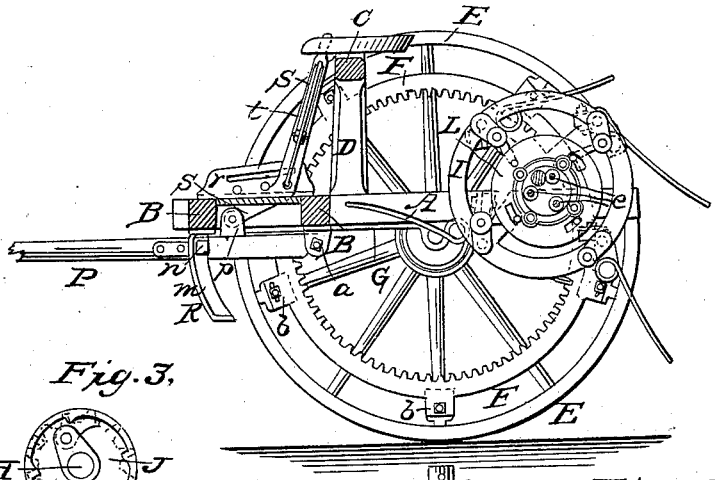


Fig. 3,

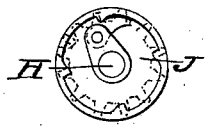
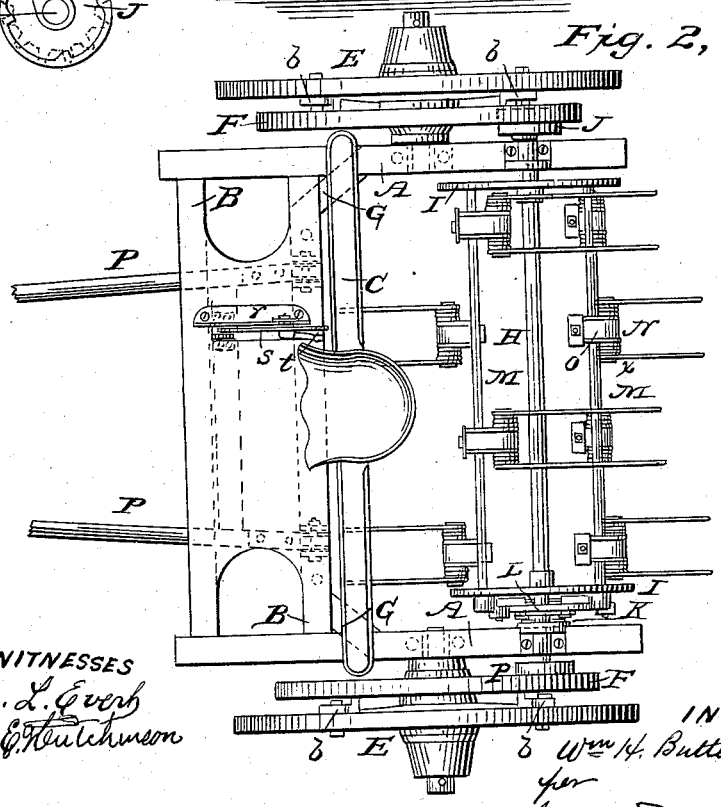


Fig. 2,



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2 Sheets—Sheet 2.

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Fig. 4,

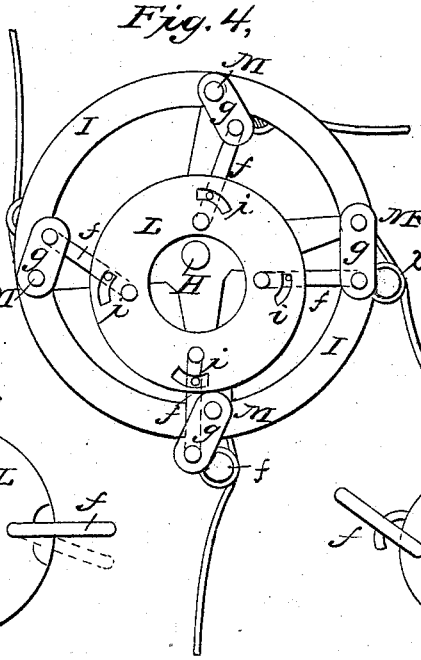


Fig. 5,

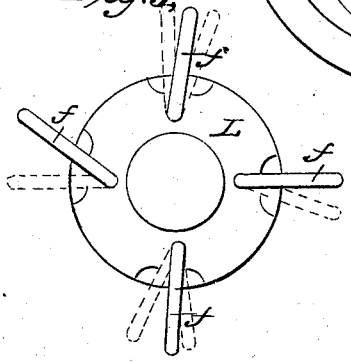


Fig. 6,

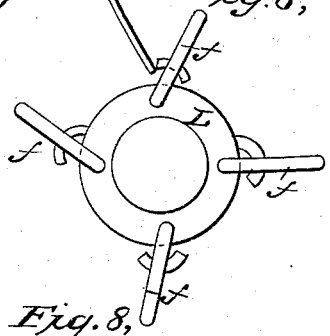
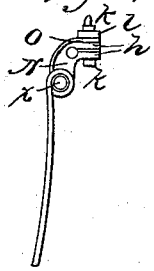


Fig. 7

Fig. 8,



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UNITED STATES PATENT OFFICE.

WILLIAM H. BUTTERWORTH, OF TRENTON, NEW JERSEY.

IMPROVEMENT IN HAY-TEDDERS.

Specification forming part of Letters Patent No. **111,041**, dated January 17, 1871.

To all whom it may concern:

Be it known that I, WILLIAM H. BUTTERWORTH, of Trenton, in the county of Mercer, and in the State of New Jersey, have invented certain new and useful Improvements in Hay-Tedder; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing, and to the letters of reference marked thereon, making a part of this specification.

My invention relates to that class of hay-tedders in which an eccentrically-revolving ring is employed to give the desired motion and position to the forks, which are attached to shafts or rods journaled in the reel-heads.

The invention consists in the novel construction and arrangement of the eccentric ring and the connecting-rods pivoted thereto, and connecting with the cranks on the fork-rods, by which a uniform rotary motion is given to the said ring by each connecting-rod alternately coming in rigid contact with the same while the reel is revolving, and revolving cranks are dispensed with, which not only simplifies the machine, but makes it durable and practically efficient.

It also consists in the combination of driving-wheel and driving-gear in a peculiar manner, whereby the gear may be readily attached to wheels having the spokes at unequal distances apart, and allow the bolts to pass through the center of the spokes.

The axle-plate, in which the axle (on which the driving-wheels revolve) is secured, is so arranged in relation with the frame that it serves as a brace for the same, and also prevents the frame from sagging in the middle, and at the same time serves as a support to hinge the shafts or pole to.

The manner of securing the fork-holders to the fork-bars is also novel, consisting of a clamp provided with two jaws, through which passes a bolt, said jaws being separated by a slit, which allows it to clamp on the fork-rod when the jaws are forced together by the bolt and nut, the tines of the forks being also secured to the jaws by the same bolt.

My invention also consists in the peculiar arrangement of the shafts and the means of raising and lowering the tedder, all of which will be hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawing, in which—

Figure 1 is a longitudinal section, and Fig. 2 is a plan view, of my machine. Fig. 3 is a view of the inside of a pinion used. Fig. 4 is an enlarged side view of the eccentric-ring, with mechanism for operating the same. Figs. 5 and 6 are modifications of said mechanism. Fig. 7 is a view of the plate, with rollers for supporting the eccentric-ring, and Fig. 8 is a side view of the fork-holder.

In constructing my machine I make an ordinary frame, of any size desired, of two side pieces, A A, and two front cross-pieces, B B. The seat of the driver is attached to a cross-piece, C, supported at each end by a standard, B, mortised in the side pieces A, and a foot-board is fastened to the two front cross-pieces B B. This frame is mounted upon a pair of wheels, E, having an internal gear, F, attached to the spokes. The axle of these wheels is secured near each end in a plate or casting, G, fastened underneath the frame, and extending along the side pieces A a suitable distance, and then along the rear cross-piece B, for the purpose of bracing the side pieces A, and also to prevent the frame from sagging. The inner ends of these plates are also provided with ears *a a*, to which shafts or a pole can be hinged.

The driving-gear F has a series of short arms, *b b*, extending out from the gear, which arms are provided with slots to correspond with the flat spokes in the main driving-wheel. The slots are for the purpose of adjusting the gear, so that, in case the spokes should not always come exactly in the same place, the slots will allow the bolt to pass through the center of the spokes, although the spokes may not be in the center of the short arms *b*.

On the rear end of the frame is mounted a reel in journal-boxes on the upper side of the side pieces A. The shaft H, to which the heads I I of the reel are secured, is journaled in these boxes, and extends out from the side pieces A far enough to receive the pinions J and to allow said pinions to cog with the driving-gears F.

The ends of the shaft are also provided with the usual pawl-and-ratchet arrangement, as shown in Fig. 3, to prevent the reel from revolving when the machine moves back. One end of the shaft H passes through a plate, K, which is secured to the inside of one of the journal-boxes for said shaft by the bolt *d*. This plate is provided with three studs, on which three small friction-rollers, *e e*, revolve. These studs are placed in such a manner that the peripheries of the three rollers *e* are eccentric to the center of the reel. On these rollers is mounted a ring, L, which is, on account of the position of the rollers on the plate, eccentric to the center of the reel.

To the eccentric-ring L are loosely pivoted four connecting-rods, *f f*, which are only allowed to vibrate or oscillate a certain distance, the distance being controlled by the connecting-rods coming in contact with the ring or suitable projections on the ring.

The ring L is provided with slots *i i*, in which the connecting-rods or projections on the rods traverse. The said rods or projections coming in contact with the ring at the end of the slots while the reel is revolving gives uniform motion to the eccentric-ring. The connecting-rods *f f*, which have one end pivoted to the ring L, have the other ends pivoted to cranks *g g*, which are attached to the fork-rods M. These cranks are made of such relative length to the eccentricity of the ring L that they will not revolve, but simply oscillate, when the reel and ring are revolving.

The fork-rods M M are journaled in the heads I of the reel, so as to allow them to oscillate with the cranks.

The fork-holders N are secured to fork-rods M by means of a clamp, O, provided with two jaws, *h h*, to receive the bolt *k*. The tines of the fork are coiled around the support *x*, and also clamped to the jaws *h*, by means of said bolt *k* and washer *l*.

The shafts or thills P are hinged to the ears *a* on the axle-plates G, which are attached on the under side of the frame of the machine, as above described.

The front cross-piece B of the frame is provided on its under side with two curved standards, R, which serve to guide the shafts when the frame is raised or lowered.

The curved guides or standards R are provided with ribs *m* on their concave sides, which are overlapped by the clips *n n*, attached to the shafts.

By removing the bolts which hinge the shafts to the ears *a* on the axle-plate G, the shafts can be readily detached from the machine without either taking off the curved guides or the clip that overlaps the rib *m*.

The lever S has its bottom end pivoted to the casting *p*, secured on the cross-bar of the shafts. This lever is made in a knee shape, so as to be within the reach of the driver at all times.

A slotted casting, *r*, is secured to the upper side of the frame, and a stud or bolt rigidly secured to the lever S passes through said slot. The lever S is also provided with a rod or catch, *t*, hinged to it near the middle. The lower end of this rod or catch is bent at right angles and passes through a hole in the lever, and then into a hole in the slotted casting *r*, just below the slot. A spring is also arranged to press against the rod or catch, to hold its lower end in the holes in the slotted casting, so that, when the lever is required to be moved, it can be done by grasping the rod or catch with the lever.

It is obvious that the same arrangement for raising and lowering the tedder can be used when a pole is used instead of the thills.

The operation of my machine is as follows: As the machine moves forward, the revolution of the driving-wheels and gears F gives motion to the pinion-wheels J, which engage in the ratchet arrangement attached to the center shaft of the reel, and consequently gives rotary motion to the reel.

The eccentric-ring L also receives a uniform rotary motion as follows: The connecting rods or arms *f* have one end pivoted to the ring L, so as to allow them to vibrate, and the other ends pivoted to the cranks attached to the fork-rods M, journaled in the heads of the reel. Each arm *f* has a projection extending out a suitable distance to engage or come in contact with the ring at the ends of the slots *i*, which they do at each vibration of the rods when the reel is revolving. The arms *f* are caused to vibrate on account of having their upper ends pivoted to the cranks *g*, which are made of such a relative length to the eccentricity of the ring L that it is impossible for them to revolve or turn over their centers, and consequently causes the said cranks to oscillate or continue to work back and forth on one side of their centers during the whole revolution of the reel.

It is obvious that the ring is not revolved by one connecting rod or arm alone, or by them all simultaneously, but by each rod alternately or successively as the reel is revolving.

The rods and stops are so arranged that, when the rods are in rigid contact, they will draw on a nearly straight line direct from the center of the eccentric-ring L. This arrangement for communicating uniform rotary motion to the eccentric-ring L is susceptible of modifications, which are clearly illustrated in Figs. 5 and 6.

It will be observed in Fig. 5 the projections or stops, instead of being on the connecting-rods, are on the ring, but the rods perform the same function by coming alternately in contact with the projections or stops on the ring; and, also, in Fig. 6 it will be observed that the projections on the connecting-rods come in contact with the periphery of the ring at each vibration, and thereby give rotary motion to the ring, substantially in the same manner as hereinbefore mentioned.

It is obvious that these modifications effectually embrace the essence of my invention, which is giving a uniform rotary motion to the

eccentric-ring by each connecting-rod alternately coming in rigid contact with the said ring while the reel is revolving.

The object of pivoting the connecting-rods to the eccentric-ring, and providing for their being in contact with said ring at intervals while the reel is revolving, as well as having their outer ends pivoted to cranks attached to the fork-rods, is apparent.

As that end of the connecting-rod which is pivoted to the eccentric-ring revolves around a different axis from the reel, the other end, being pivoted to the cranks attached to the fork-rods, gives the desired motion and position to the forks at different parts of the revolution of the reel, whereby they strike and tedder the grass, and, after raising it a suitable distance from the ground, draw away from the grass to prevent it from winding on and clogging the reel.

The position of the forks in relation to the ground can be changed by altering the position of the plate K, carrying the small rollers *e e*, on which the eccentric-ring revolves. This is done by removing the screw *d*, which secures the plate to the journal-box of the reel, and then moving the plate, which, consequently, moves the eccentric-ring, and it, being connected to the cranks on the fork-rods by the arms *f*, causes the forks, which are rigidly attached to the fork-rods, to alter their inclination and to have their reciprocating movement, which clears them from the grass at a different part of the revolution of the reel, so that the plate K can be secured in such a position that the forks will, in thick and tangled grass, (which is more likely to wind on the reel,) drop the same in ample time to prevent it from clogging.

The friction-rollers *e e* may also be made capable of radial adjustment to compensate for wear.

It will be observed that each connecting-rod or arm *f* acts to revolve the eccentric-ring L only a certain distance, and recedes, as it were, from rigid contact, the next rod in turn coming in rigid contact in ample time to keep the said eccentric-ring in a continuous uniform rotary motion.

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

1. The connecting-rods *f*, having one end pivoted to the cranks *g* and the other end pivoted to the ring L, when arranged substantially as described, so that each rod will alternately come in rigid contact with said ring or suitable projections on the same while the reel is revolving, for the purpose of imparting a continuous rotary motion to said ring, substantially as set forth.

2. In combination with the above, the oscillating fork-rod M and its crank *g*, arranged and operating substantially as and for the purposes set forth.

3. The fork-holders N and their clamps O, provided with jaws *h h*, clamping-bolt *k*, and washer *l*, in combination with the coil-support *x*, all constructed and arranged substantially as and for the purposes herein set forth.

4. The combination, with the driving-wheel E, of the driving-gear F, having the arms *b b*, provided with concentric slots, whereby the gear may be readily attached to wheels having spokes unequally placed and allow the bolts to pass through the center of the spokes, substantially as described.

5. The combination, with the frame of the machine, of the axle-plates G G, constructed as described, and provided with ears *a a*, substantially as and for the purposes herein set forth.

6. The combination, with the frame of the machine and the shafts or thills P, of the curved metallic standards R, ribs *m*, and clips *n*, substantially as and for the purposes herein set forth.

7. The device for raising and lowering the tedder, consisting of the slotted and perforated casting *r* and the lever S, having its lower end pivoted to the cross-bar of the shafts, and provided with a stud or bolt, and the spring-catch *t*, all constructed and arranged to operate substantially as and for the purposes herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 16th day of December, 1870.

WILLIAM H. BUTTERWORTH.

Witnesses:
ALBERT J. WHITTAKER,
JOHN BUTTERWORTH, Jr.