W. W. SHAW & W. M. HOLMES.

HAY TEDDER FORK.

APPLICATION FILED SEPT. 8, 1905.

986,511. Patented Mar. 14, 1911.

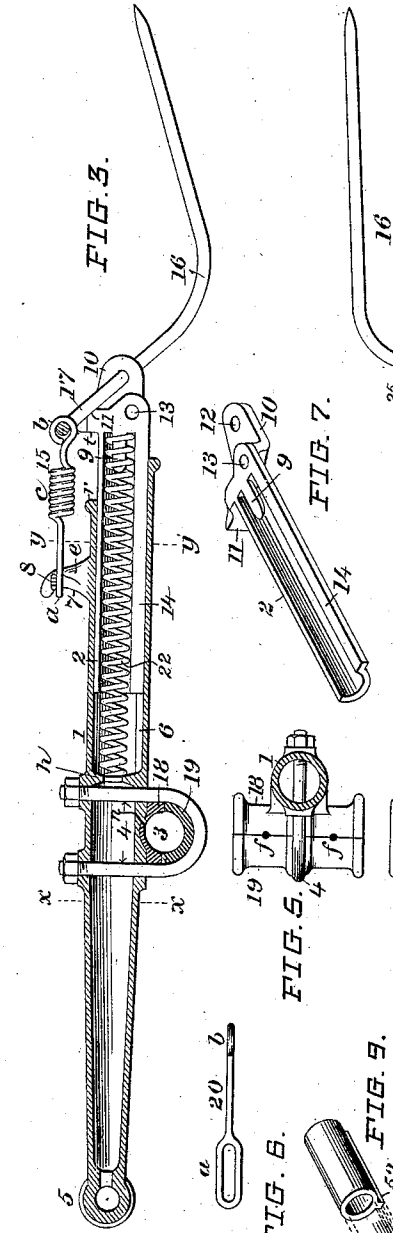

FIG. 3.

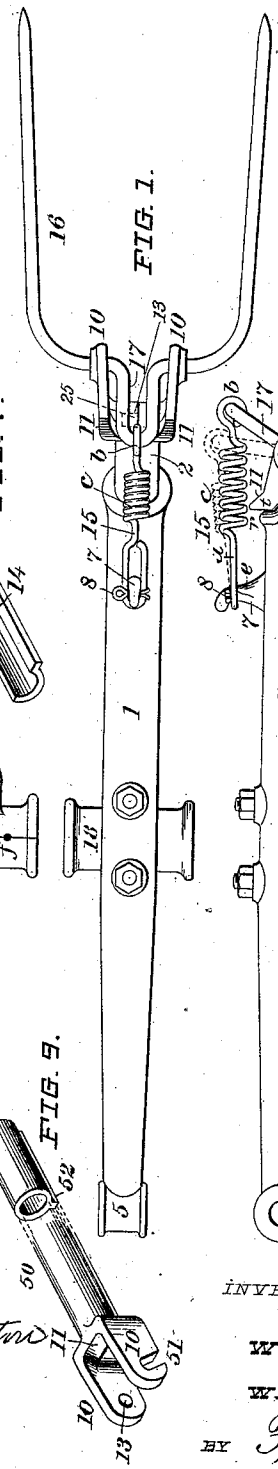

FIG. 1.

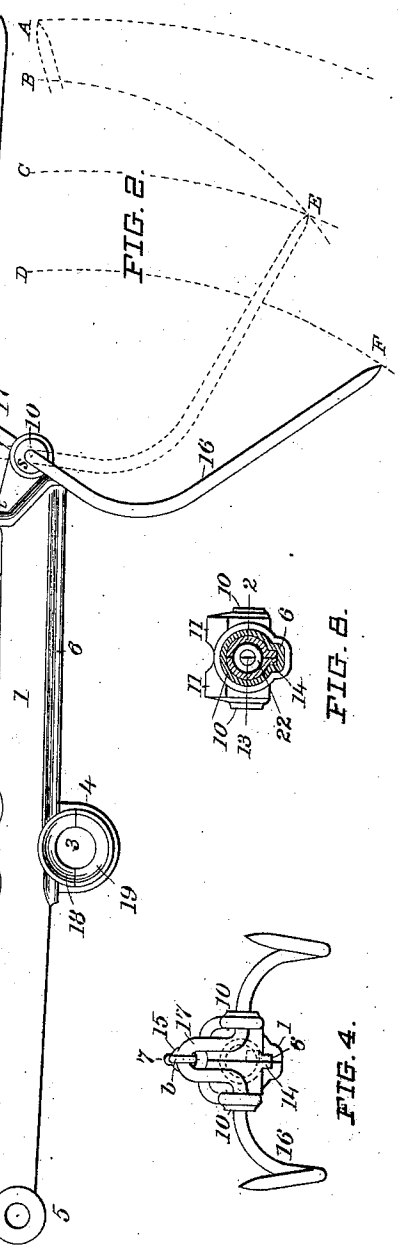

FIG. 2.

FIG. 7.

FIG. 5.

FIG. 6.

FIG. 9.

FIG. 8.

FIG. 4.

WITNESSES:

Charles H. Knights

W. S. Shaw

INVENTORS:

WILLIAM W. SHAW.

WATSON M. HOLMES.

BY Franklin Scott, ATTORNEY.

UNITED STATES PATENT OFFICE.

WILLIAM W. SHAW AND WATSON M. HOLMES, OF HOOSICK FALLS, NEW YORK.

HAY-TEDDER FORK.

986,511. Specification of Letters Patent. Patented Mar. 14, 1911.

Application filed September 8, 1905. Serial No. 277,621.

To all whom it may concern:

Be it known that we, WILLIAM W. SHAW and WATSON M. HOLMES, citizens of the United States of America, and residents of the village of Hoosick Falls, in the county of Rensselaer and State of New York, have invented certain Improvements in Hay-Tedder Forks, of which the following description, in connection with the accompanying sheet of drawings, constitutes a specification.

This invention relates to that class of hay tedders commonly known as the "grasshopper" or "kicker" variety, and the improvements embrace modifications of the fork arms and mechanism for operating the forks. Among the more prominent features of invention embodied in these improvements the following may be mentioned: Instead of mounting the forks in bearings which are attached to or constructed as a part of the arm itself a separate member is provided which we call a fork-holder to which the fork is attached that is fitted to slide telescopically inside of the arm, which is made hollow for that purpose, and the mechanism for imparting to the fork its kicking movement when it is turned backwardly is inclosed within the arm and acts directly upon the forkholder with a force tending to push the holder out of its chamber inside of the arm. As the forkholder is connected with the arm by a link connection when the tines of the fork in service engage any obstacle which turns them backwardly, the fork acts as a lever to push the forkholder upward into the hollow arm thus materially shortening the arm and reducing the chances of breaking the fork. With this hollow arm either an integral forkholder or one made in semi-sections of which each carries a tine bearing may be used. The fork arm and forkholder may be so designed that either may move upon or within the other, and the stem of the forkholder may be either hollow or solid according as the actuating spring may be inclosed within the stem or may surround it if solid. The link connection between the top loop of the fork and the body of the arm may be an elastic or yielding connection in which case the stress of this connection normally is exerted against the stress of the mainspring or other means which imparts to the forks their kicking motion.

Minor features of novelty and invention will appear in their proper places in this description and will be pointed out in the claims.

The invention is fully disclosed in the drawings wherein—

Figure 1 shows a view of the upper side of a tedder fork detached from the machine. Fig. 2 is a side view of the same parts with the fork tines retracted to their extreme limit. Fig. 3 is a vertical axial section of a fork and arm with our invention embodied therein. Fig. 4 is a front end view of such an arm. Fig. 5 is a rear view of a transverse section of an arm taken on the plane x, x, of Fig. 3. Fig. 6 is a modification of the link which connects the fork with the arm. Fig. 7 is a perspective view of one of the semi-tubular fork-bearing slides. Fig. 8 is a transverse section taken on the line y, y, of Fig. 3 and shows the form and relation of the arm, bearing slides, mainspring and centering studs of the slides. Fig. 9 is a modification of the forkholder.

Hay tedder fork arms have generally been made and used with a fixed or constant space or distance between the center of oscillation of the arm and the axis of rotation of the tines, or in other words the tines have been arranged to turn on a fixed center, the tine-bearings being fixed relatively to the arm. In this invention the length of the arm from its center of oscillation to the end of the tine bearings can be shortened materially by the retroversion of the fork whenever it is turned in its bearings by encountering an obstruction. This characteristic contributes largely toward eliminating the "teeter" motion so often found in many tedders in present use employing the "grasshopper" movement of the fork arms. The tendency to breakage of the forks is also greatly reduced on account of the high degree of elasticity imparted to the whole machine by our improved construction. As no bolts, screws or rivets are required in assembling and maintaining the parts in which our invention is embodied in coöperative relation, the facility for making repairs or substituting parts is greatly improved and the construction and operation of the machine greatly simplified.

In carrying out the invention an arm 1 is employed preferably hollow throughout its length as shown, which in use is hung by its bearing 3 upon a crank shaft (not shown) in the ordinary way, its top being connected at 5 with a link also not shown.

As these connections are well understood no further description of them will be given. The lower half of the arm is a cylindrical tube of practically uniform caliber except that on one side it is enlarged as at 6 to provide for a longitudinal groove for the reception of feather ribs 14 of the bearing slides. The groove and feather ribs are a provision for preventing the slides from rotating within the arm. But, the tubular bore of the arm and the groove and ribs are not an essential form for these parts, as a prismatic form of bore and slides and many other styles would answer this purpose of preventing rotation of the slides in the arm.

Two semi-tubular sliding tine bearings 2, 2, are provided one of which is seen in Fig. 7, for carrying the fork. Each of these has an ear 10 bored as at 12 for the passage and bearing for a tine as seen in Fig. 3. These two slides are counterparts of each other and when put together are held in correct position by a dowel pin in one which enters a hole in the other 13. Each has a feather rib 14 and the two together fill and slide in the groove 6 of the arm. Each half has a semi-stud 9 which together when in position form a centering stud over which one end of the mainspring 22 fits closely so that its coils may act as a ring or collar to hold the two slides in true concentric position. The upper portions of the heads of these slides are formed so as to leave seats 11 against which the under side of the top loop of the fork can rest when the head is thrown forward by the mainspring to its outermost limit. The fork 16 is of the shape commonly used in tedders of this class as seen in Fig. 1, and in use the top loop 17 is connected with the arm 1 by a link 15 which has an eye *b*, through which the loop 17 passes and an elongated loop *a*, which is adapted to catch over the stud-hook 7 of the arm 1. Loop *a* is prevented from dropping down on said hook by lugs *e* on its sides, and from rising off over the hook by a cotter 8 which passes through the stud over the loop. Link 15 may be provided with a spring coil *c*, as in Fig. 3 or it may be rigid as in Fig. 6. A mainspring 22 is arranged to occupy the tubular chamber within the assembled slide bearings and the arm. This mainspring finds rear abutment against the ring shoulder *h*, on the inside of and which is cast integral with the body of the arm as shown in Fig. 1, but any other sort of an abutment may be provided. Its other end finds its seat around the stud 9 at the bottom of the chamber formed by the two semi-tubular slide bearings. This mainspring is expansible in use and acts to push the slides out of the arm chamber. This force is counteracted by the link (15) connection of the fork with the stud-hook 7 on the arm. When the elastic link 15 is employed the coil *c* is made stronger than the mainspring so that in service if the points of the fork catch in the turf or engage a tangle in the cut crop offering sufficient resistance to turn the tines backwardly thereby producing a tensile stress on coil *c* and compression upon the mainspring the latter will yield to the former.

When the parts are assembled for use the bearing slides are fitted to move telescopically with freedom in the chamber of the arm, and may be lubricated through the oil holes *f*, *f*, of the boxes 18—19, the lubricant finding its way from that bearing to the crank shaft and thence through a duct *n*, Fig. 3, to the interior of the slide-chamber of the arm.

To assemble the parts the eye *b*, of the link should be passed over one tine and brought into position in top loop 17 of the fork. Then the right and left slide bearings should be brought into position by passing the right and left tines of the fork through the eyes 12 of the respective right and left slides and bringing the two slides into apposition so that the dowel of the right slide will enter the hole 13 of the left slide. The mainspring may then be dropped into position inside of the slides care being taken that its lower end enters over the center stud 9 firmly so that the two slides will be drawn closely together. The slides are then inserted in the tubular arm, the ribs 14 entering the groove 6 of the arm, and holding the fork with its top loop resting back against the head it is forced back against the resistance of the mainspring until the link is carried far enough back for the loop *a*, to drop over the top of the stud-hook 7 where it rests on the lugs *e*. The cotter is then inserted and the apparatus is ready for use.

The operation of the fork is as follows: Normally, the mainspring forces the slide bearings forward until the straightening out of arm, link and fork brings the top loop of the fork down upon or against the seats 11 of the slide heads where they rest. Then in action on the downstroke of the arm if the fork tines encounter anything offering more resistance than that which the mainspring will overcome or withstand; the mainspring yields and the slides are forced backwardly into the chamber of the arm. The relative strength of the coil 3 of the link and of the mainspring are so gaged that the coil will not yield until the fork has been forced back until the shoulder *t*, of the head strikes the abutment *r*, at the end of the arm as seen in Fig. 3. When this contact takes place the fork will have turned back from the position shown in Fig. 3 and at A in Fig. 2, to the position shown in dotted lines at E in Fig. 2. During this movement of the fork, which may be considered as a lever, its fulcrum pivot has been

at the center of the eye *b*, of the link, but from the moment of contact between shoulder *t* and abutment *r*, the fulcrum pivot shifts to the tine bearing at 12, and further obstruction of the tines as the machine advances causes them to rotate about the latter pivot which causes the coil to be stretched slightly as shown in full lines in Fig. 2, thus permitting the fork tines to recede from the position at E to the position at F. In this position the effort of the combination to throw the tine points forward either to lift and scatter an accumulation of hay or to kick the obstacle out of the way is greatly augmented beyond what the mainspring alone can effect, as a powerful spring is operating on each arm of the lever in opposite directions on opposite sides of its fulcrum pivot at *s*. This combination of forces greatly augments the efficiency of the machine. Thus it will be seen that the coil in the link is brought into action only in cases of emergency, either to assist in shortening the arm to get over a high obstacle, or to lift and spread an abnormally heavy accumulation of hay or grass. This arm-shortening feature of this invention is forcibly brought out in the diagrammatic illustration in dotted arcs in Fig. 2. Arcs A, C and D are struck with the center of the crank wrist box 3 as a radial center. The dormant position of the points of the tines is at A. Back-thrust of the bearings until contact between the points *t*, and *r*, takes place will carry the points down to E, which will shorten the radius about one fifth its original length from 3 to A. Further back-thrust which will carry the points back to F, thereby calling into operation the link coil, will shorten the radius nearly one third its original length, or a distance equivalent to A—D. This operation may be contrasted with an arm and fork of the machines now in common use by assuming that the slide bearings are fixed on the arm and that the axis of fork motion is at *s*, Fig. 2. Then the points of the tines will be at B. A back thrust which will force the tines back to E gives only a shortening of the whole radius from B to C.

We therefore claim the following as our invention:

1. A hay tedder fork arm consisting of an upper and a lower member, the latter being adapted to slide along the former for shortening their aggregate length, means carried by the upper member for connection with the tedder driving mechanism, a fork journaled upon the lower member, a link connecting the fork with the upper member, and means engaging the lower member for imparting to it a sliding movement in relation to the other member, substantially as specified.

2. A hay-teddering implement consisting of an operating member hung to the main frame, a crank-wrist upon which said member is pivoted, a forkholding member, a fork pivoted thereon, a chamber in one of said members in which the other member may slide, a spring contained in said chamber, and a connection between said fork and said operating member, all combined and adapted to operate substantially as specified.

3. The combination in a hay tedder of the class described, of a fork arm consisting of an inner and an outer member telescopically connected, an internal chamber in one of said members, a spring carried in said chamber adapted to act expulsively on the inner telescopic member, a fork pivoted on said inner member and connected with the outer member, substantially as specified.

4. The combination in a hay tedder of the class described, of a fork arm consisting of an inner and an outer member, telescopically connected, one sliding within the other, an internal chamber in the outer one of said members, a spring carried in said chamber adapted to act expulsively on the inner member, a fork pivoted on said inner member, and a link connection between said fork and the outer member, substantially as specified.

5. The combination in a hay tedder of the class described, of a fork arm comprising an operating member and a forkholding member one of which is inclosed and adapted to slide within the other, a fork pivoted on the forkholding member, and a link connecting said fork with the other member, substantially as described.

6. The combination with a hollow member of a fork arm, a forkholder adapted to slide therein consisting of two counterparts each provided with a fork tine bearing, and means connected therewith for maintaining their coöperative relations and for performing their respective functions, each of said counterparts constituting a half of a longitudinal member to coöperate with said hollow member, substantially as described.

7. The combination with a hollow member of a fork arm, of a forkholder adapted to slide within said member and provided with tine bearings for journaling a tedder fork, a fork, a connection between said fork and hollow member, and means for effecting the sliding of said forkholder within said hollow member, substantially as specified.

8. In a hay tedder fork arm of the class described, a hollow actuating member, a forkholder having a hollow tubular extension adapted by the turning of the fork on its bearings to slide within said member, an expansive spring carried in said member and forkholder adapted to force the holder outwardly, a fork pivoted on said holder, and a connection between said actuating member and the fork, substantially as specified.

9. In a hay tedder fork arm of the class described, a hollow actuating member, a forkholder having a hollow, tubular extension adapted to slide within said member, an expansive spring carried in said member and holder adapted to force the holder outwardly, a fork pivoted on said holder, and a yielding connection between the fork and said actuating member, substantially as described.

10. In a hay tedder of the class described, a fork arm comprsing a tubular actuating member, a forkholder having a tubular extension adapted to slide within said member, an expansive spring carried in said member and forkholder adapted to force the holder outwardly, a fork pivoted on said holder, a link connecting said member and the fork, the connection between said link and member being such that when the link is pushed back or upwardly the connection becomes separable, substantially as specified.

11. In a hay tedder of the class described, a fork arm comprising a tubular actuating member, a fork holder having a rear extension adapted to reciprocate within said member by turning the fork on its pivot, an expansive spring carried in said member adapted to force the holder outwardly, a fork pivoted on said forkholder, and a connection between the fork and said member, substantially as specified.

12. In a hay tedder of the class described, a fork arm comprising a tubular actuating member, a forkholder having a rear extension adapted to reciprocate within said member and an expansive spring carried in said actuating member adjusted to force the holder outwardly, a fork pivoted on said forkholder, and a yielding connection between said fork and said actuating member, substantially as specified.

13. The combination with an actuating member of a fork arm, a sliding forkholder, mainspring, a fork, of an elastic connection between the fork and actuating member, substantially as specified.

14. The combination with the actuating member, forkholder, fork and mainspring of a hay tedder of the class described, of an elastic link connection between the fork and actuating member, the retractile force of which exceeds the expansive force of the mainspring, substantially as specified.

15. In the described hay tedder the combination with the actuating arm, sliding forkholder, mainspring, pivoted fork and elastic link connection, of means for limiting the backsliding of the forkholder, whereby the fulcrum of the fork, by the action of such limiting device is transferred to the pivot eyes of the forkholder, substantially as specified.

16. The combination with the mainspring and the semi-tubular forkholding slides, of the centering semi-studs at the bottom of the spring chamber within the slides, as a means for centering and binding the two slides together, substantially as specified.

17. The combination with the upper member of the fork arm provided with the stud-hook, of the forkholder and a fork pivoted thereon, a link having a loop connecting the fork and stud-hook, and means for preventing disengagement between said loop and hook, substantially as specified.

18. A hay tedder fork arm consisting of a supporting member and a movable member slidable thereon, a fork pivoted on the slidable member and connected with the other member, and means for sliding the movable upon the supporting member, substantially as specified.

19. A hay tedder fork arm comprising a hollow supporting member and carrying mechanism therefor, a fork holder adapted to slide therein, a fork pivoted on said fork holder, a link connecting said member and fork holder, and means inclosed within said member for exerting an expelling force against the forkholder, substantially as specified.

In testimony whereof we have hereunto subscribed our names at North Bennington, Vermont, this 28th day of August, 1905, in the presence of two witnesses.

WILLIAM W. SHAW.
WATSON M. HOLMES.

Witnesses:
FRANKLIN SCOTT,
EMILY SCOTT.