2 Sheets—Sheet. 1.

M. C. BURR.

Horse Hay-Rake.

No. 199,143. **Patented Jan. 15, 1878.**

Fig. 1.

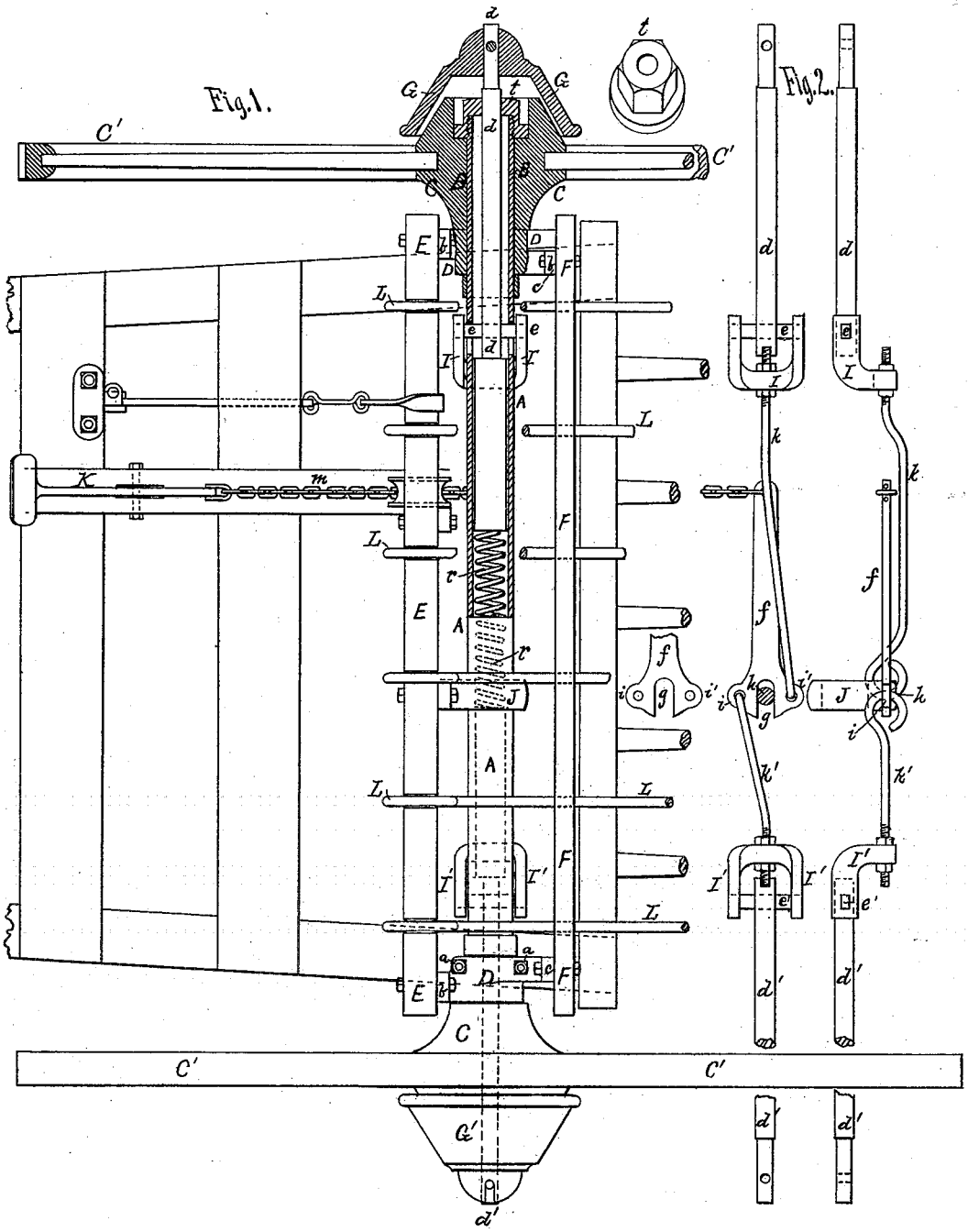

Fig. 2.

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John F. Halsted.

Melbourne Clinton Burr,
Inventor, By
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Attys.

2 Sheets—Sheet 2.

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Fig. 3.

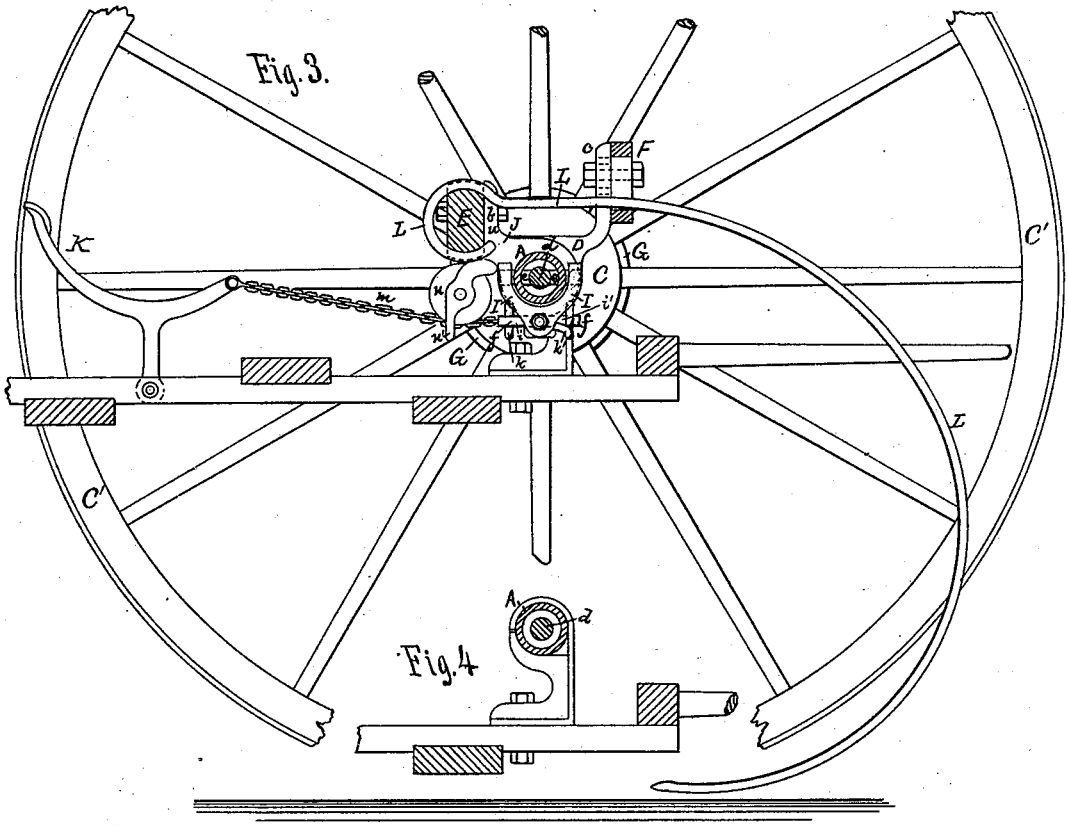


Fig. 4

Fig. 5

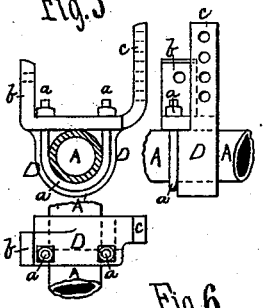


Fig. 6.

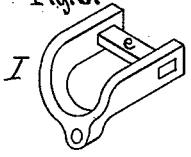


Fig. 7.

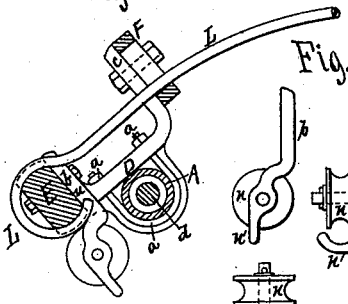


Fig. 8.

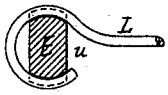
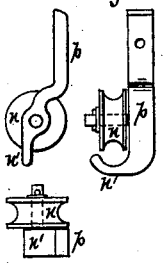


Fig. 9



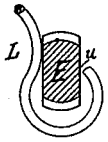
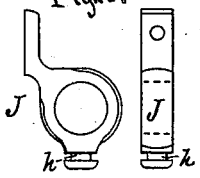


Fig. 10.



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Inventor, By
Louis Fesser & Bro.
Atty's.

UNITED STATES PATENT OFFICE.

MELBOURNE C. BURR, OF MINNEAPOLIS, MINNESOTA.

IMPROVEMENT IN HORSE HAY-RAKES.

Specification forming part of Letters Patent No. **199,143**, dated January 15, 1878; application filed September 24, 1877.

To all whom it may concern:

Be it known that I, MELBOURNE CLINTON BURR, of Minneapolis, in the county of Hennepin and State of Minnesota, have made certain new and useful Improvements in Self-Dumping Horse Hay-Rakes, which invention is fully set forth in this specification and accompanying drawings, in which—

Figure 1 is a half-sectional plan view. Fig. 2 is a plan and side view of the mechanism by which the friction-clutches are operated. Fig. 3 is a sectional side elevation; and Figs. 4, 5, 6, 7, 8, 9, and 10, detail views of different parts detached.

This invention relates to horse hay-rakes; and consists in forming the collars against which the hubs run, and the brackets or arms which support the rake-head and slotted board, of one piece, as hereinafter explained.

The invention further consists in the mechanism by which the clutches are operated, as hereinafter specified.

The invention further consists in the manner of forming the eyes of the teeth, and in the method of securing them to the head, as hereinafter set forth.

A is the axle, and B B′ the journals, upon which the hubs C of the wheels C′ run, all made in one continuous piece of gas-pipe or other tubing. D D′ are two collars, against which the hubs run, secured to the axle in the proper position by straps *a a′*. *b b′* are two brackets or arms, to which the rake-head E is bolted, and *c c′* two similar arms, to which the usual slotted board F is bolted. These arms *c c′* are provided with a series of holes, so that the board F may be set higher or lower to regulate the position of the points of the teeth. These arms *b c* will be cast in one piece with the collar D.

d d′ are two rods, having their ends squared, and passing through square holes in two caps, G G′, made in a conical form and fitting over the outer halves of the hubs C C, which are made of a similar form, (see Fig. 1,) thus forming friction-clutches.

The rods *d d′* pass inward through the hollow journals B B, and on into the axles A, and have their inner ends connected by pins *e* to yokes I I′ on the outside of the axle, by which means the clutches are operated.

f is a lever, having an open-ended slot, *g*, in one end, which fits around a pin, *h*, on a collar, J, upon the axle A, and is provided with two projections or elbows, *i i′*, which are connected by rods *k k′* to the yokes I.

By pulling upon the lever *f* the yokes are pulled inward toward each other, and, being connected to the clutches G C, will operate them.

The slot *g* in the lever *f*, it will be observed, is left open, so that the lever may be placed upon the pin *h* without the use of a nut, and is longer than the pin, so that the lever is free to move back and forth slightly, to enable it to form its own fulcrum and adapt itself to any irregularities that may occur in the clutches.

K is a foot-lever, connected to the lever *f* by a chain or its equivalent, *m*, which chain passes between a pulley, *n*, and guide-hook *n′*, suspended by a bracket, *p*, to the rake-head E. By pressing upon the lever K with the foot, the operator is enabled to throw the clutches into gear and dump the load.

r is a spring placed in the center of the axle, between the ends of the rods *d d′*, to throw the clutches out of gear when not in use. *t t′* are the nuts which hold the wheels upon the journals, and are made to encompass the rods *d d′*, and thus serve the double purpose of nuts to the axle and supports to the rods, to hold the caps G in the center and prevent them dropping down and grinding upon the hubs.

The connecting-rods *k k′* are attached to the yokes I by double nuts, so that they may be adjusted to suit the clutches.

E is the rake-head, which is formed of a flat piece of wood about twice as wide as it is thick, and bolted sidewise to the arms *b b′*, as before described. A series of recesses are cut in the narrow edges to receive the teeth L. The heads of these teeth L are bent around in the form of an incomplete circle, (see Fig. 8,) the incomplete portion *u* being a trifle wider than the thickness, and much narrower than the width, of the head E, so that, when the eyes are slipped upon the head the narrow way, (see lower view of Fig. 8) and turned partially around in the grooves made for them in the narrow edges of the head, the extra width of the head will prevent their removal except

by the same movement by which they were inserted, but which is prevented by the slotted board F.

One advantage of the hollow axle is that it enables me to apply the friction-clutches to the outside of the hubs by running the rods *d* through the interior, by which all danger of stripping the threads is avoided, as all the strains come in the opposite direction.

Another advantage gained by the use of the hollow axle is that it enables me to use a long rod, *d*, and thus obtain a much better result, as the elasticity of the metal of which the rods are composed will act as a slight spring to gradually apply the power.

I am acquainted with the patent of Solon H. Bushnell, March 2, 1875, No. 160,387, which shows a hollow axle having a solid journal screwed thereto and a friction-clutch applied to the inside of the hub. But in this case it is necessary to make the clutch in several parts, which adds to the expense and liability of becoming disarranged, while my clutch is made of only two pieces, and is applied outside the hub. Moreover, my hollow axle is utilized for several purposes, while Bushnell's is simply to reduce weight.

I am also acquainted with the patent of Barclay & Kennedy, October 11, 1875, No. 168,552, which shows a hollow journal secured to a solid axle and a pawl-and-ratchet clutch applied to the outside of the hub, the clutch being operated by a rod passing through the hollow journal and connected by rods to a common lever in the center between the wheels. But the very necessary simultaneous action of the wheels can only be obtained with friction-clutches, as the ratchet-teeth require the pawls to move through so long a space that unless the wheels act in perfect concert one dog catches before the other does, and thus does all the work while the other runs idle.

This necessary concert of action of the wheels can never be obtained in ratchet-clutch horse hay-rakes, as the slightest irregularity of ground is enough to disarrange them; but with friction-clutches this objection is avoided, as every part of the surface of the clutch is a bearing-surface, and is entirely independent of the position of the wheels.

Another advantage gained by my arrangement of the clutch-actuating mechanism is that it may be secured to the axle and revolve with it, so that the foot of the operator, after the foot-lever K is pushed down, returns backward to its old position, instead of moving forward with the rising of the teeth, as is the case when the mechanism is attached to the head. By this means a much more natural and agreeable movement is obtained, and is less fatiguing to the operator.

The method of forming and securing the teeth to the rake-head is a very important feature of my invention, as by its use I am enabled to dispense with the cumbersome and expensive clamps used on other rakes. Its great simplicity will render it very sure of operation and less liable of becoming disarranged than in the old styles.

A hand-lever, M, may be applied to the head E in the usual manner, if desired.

By forming the yokes I to embrace both sides of the axle, the rods *d d'* are acted upon in a line parallel with the axle, so that no strain is put upon them except in this direction, thereby avoiding the great strain which must occur when the power is applied to one side only, as in Barclay & Kennedy's arrangement.

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

1. The combination and arrangement of the axle A, collars D D, having the arms *b b' c c'*, rake-head E, and slotted board F, substantially as hereinbefore specified.

2. The combination and arrangement of the conical hubs C C, caps G G', rods *d d'*, spring or springs *r*, yokes I I', connecting-rods *k k'*, and lever *f*, having the elongated slot *g*, substantially as hereinbefore set forth.

3. The hollow nuts *t t'*, in combination with the journals B B', hubs C C, and rods *d d'*, arranged and operating substantially as hereinbefore described.

4. The rake-head E, formed as shown, in combination with the tooth L, having the opening *u* of a less extent than the width of the rake-head, as hereinbefore explained.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

MELBOURNE C. BURR.

Witnesses:
C. N. WOODWARD,
LOUIS FEESER.