

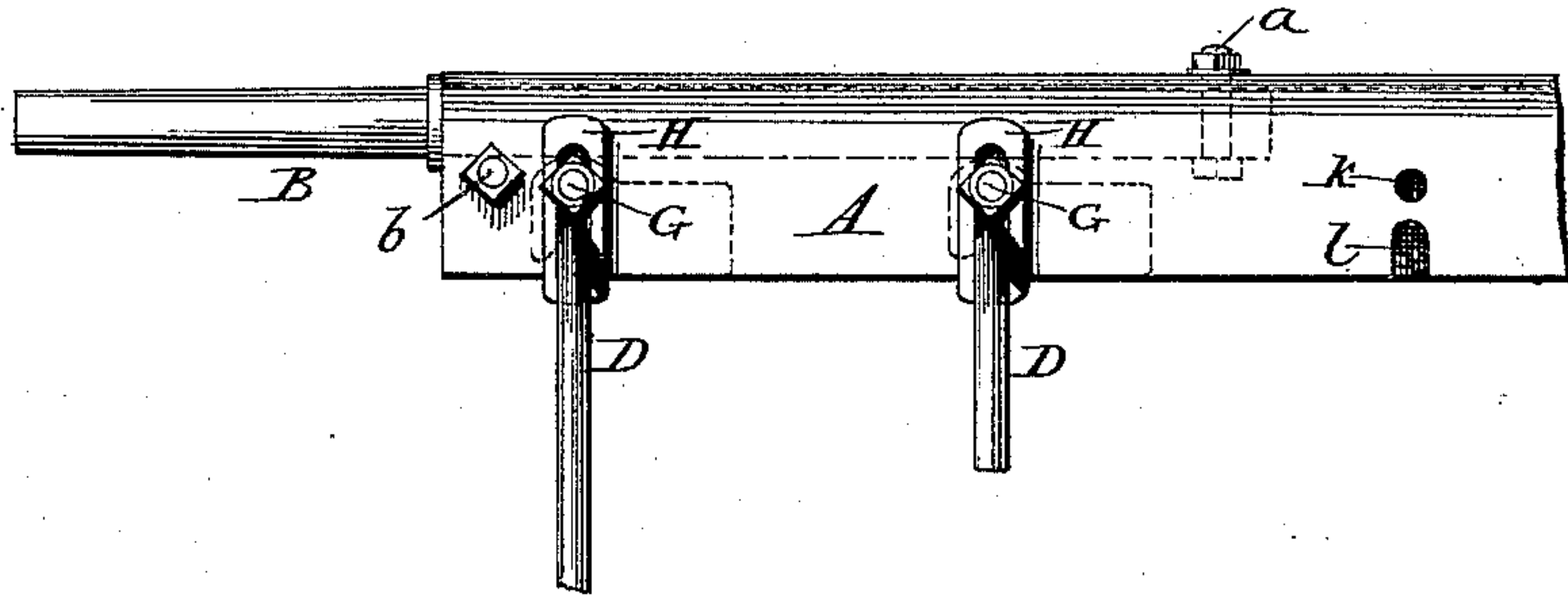
(No Model.)

E. P. LYNCH.  
HORSE HAY RAKE.

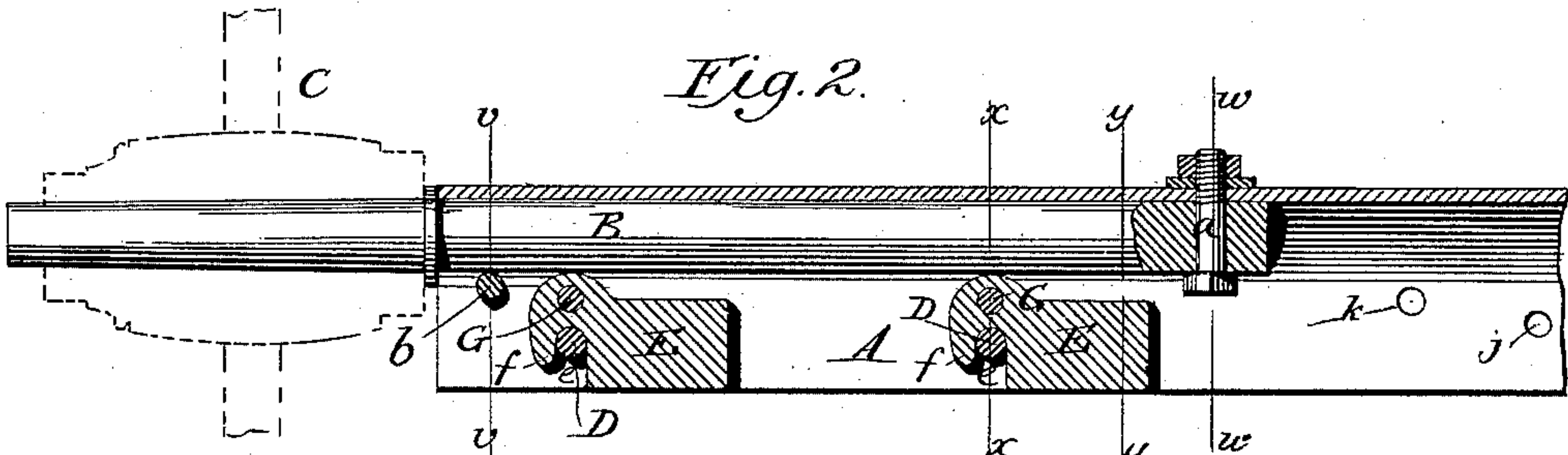
No. 387,172.

Patented July 31, 1888.

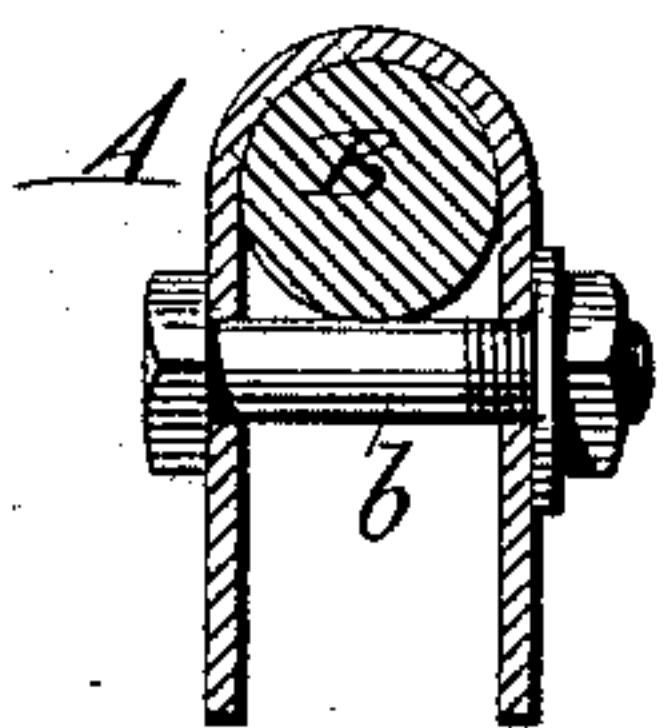
*Fig. 1.*



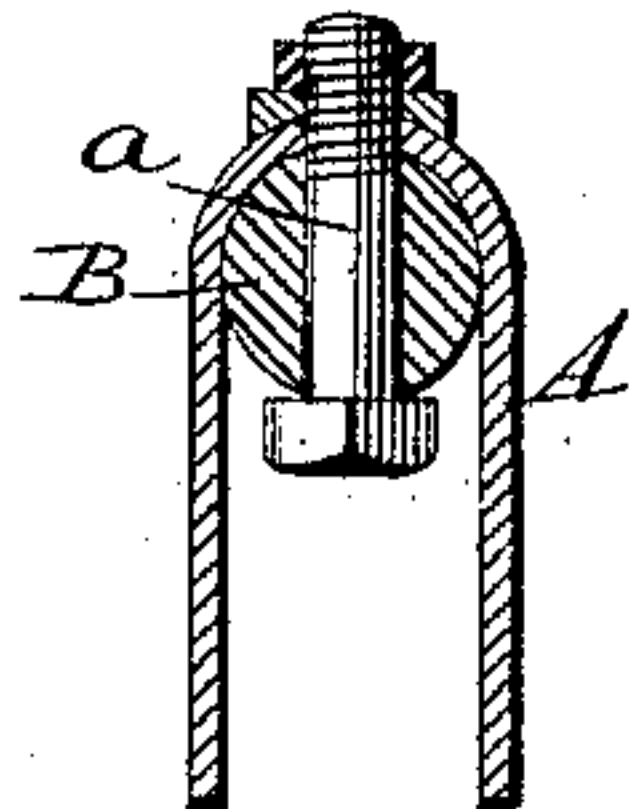
*Fig. 2.*



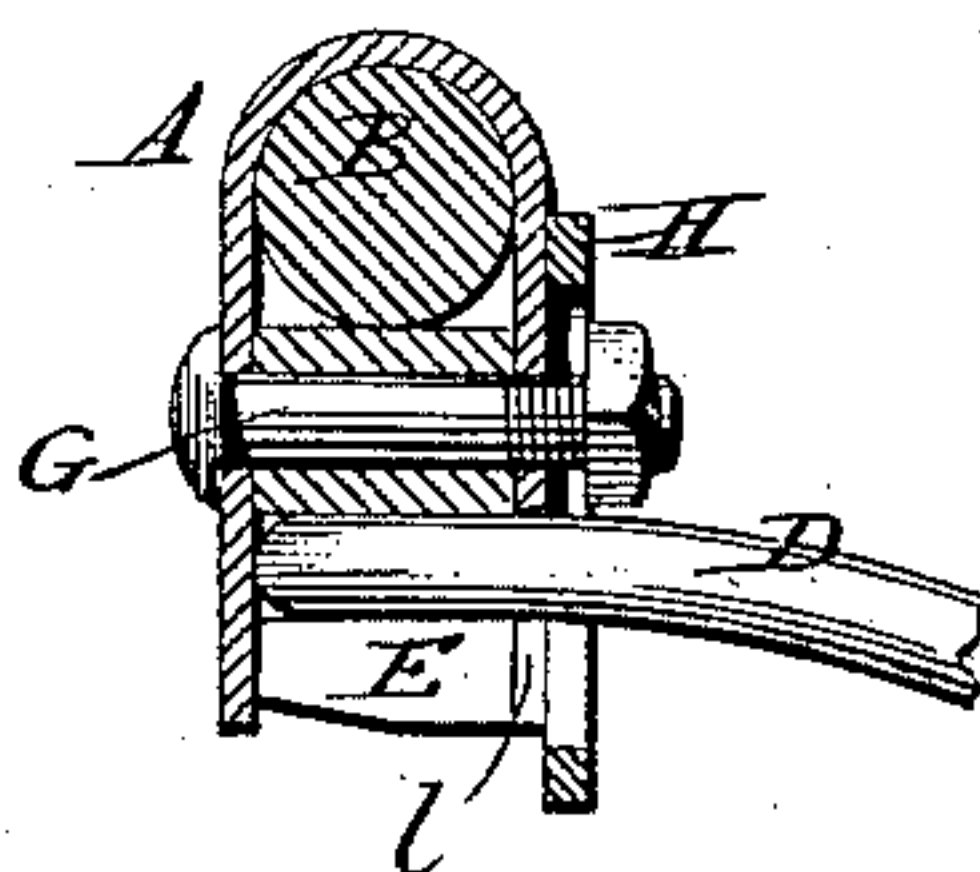
*Fig. 3.*  
on v-v



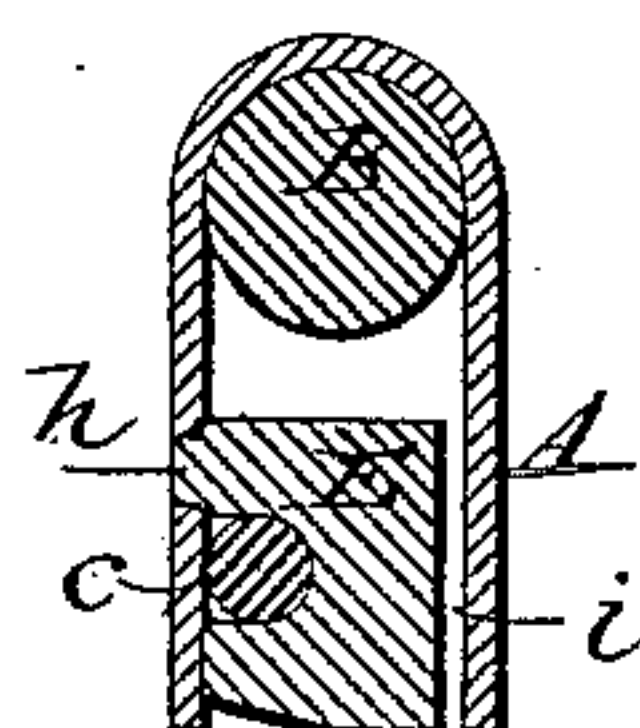
*Fig. 4.*  
on w-w



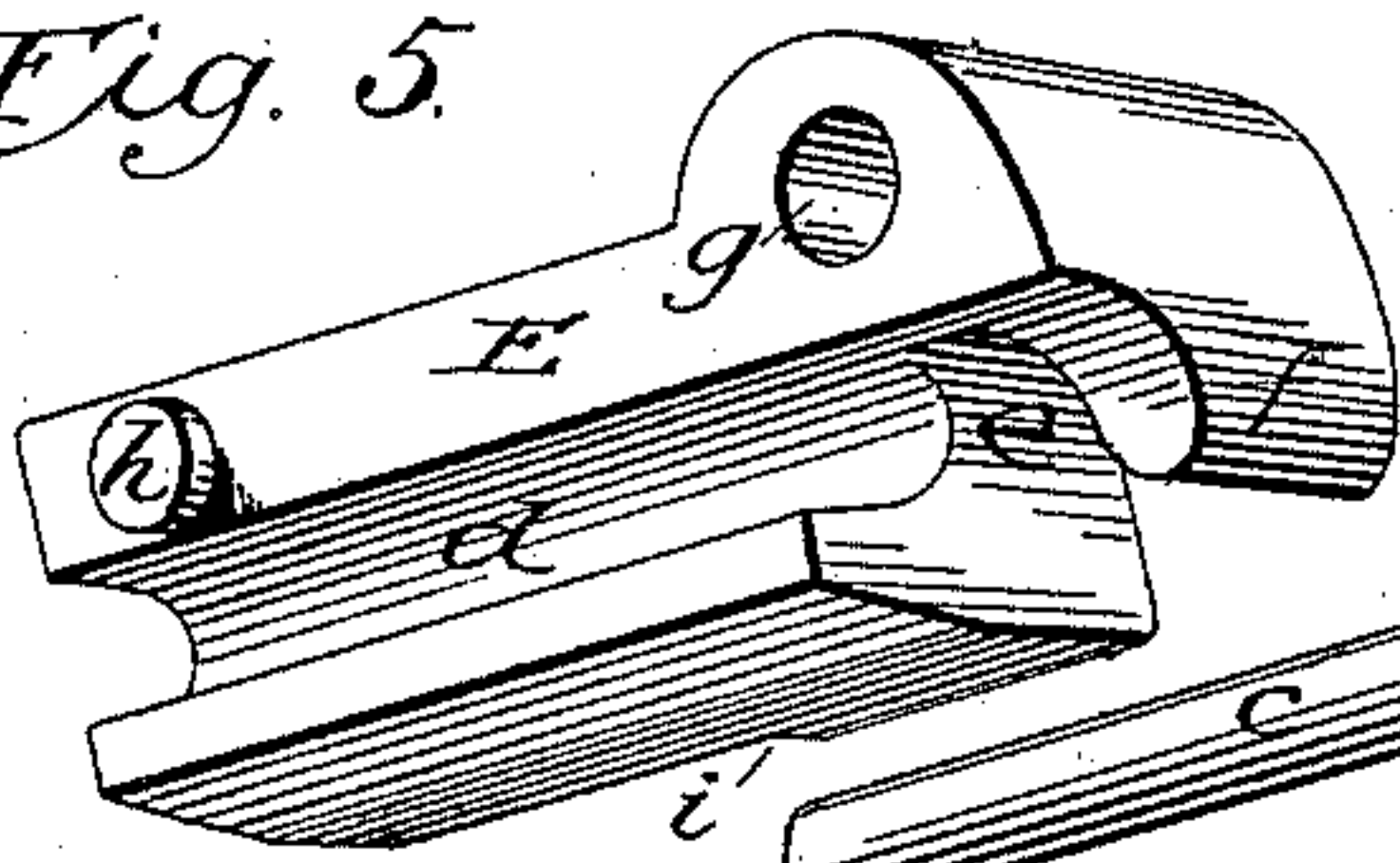
*Fig. 6.*  
on x-x



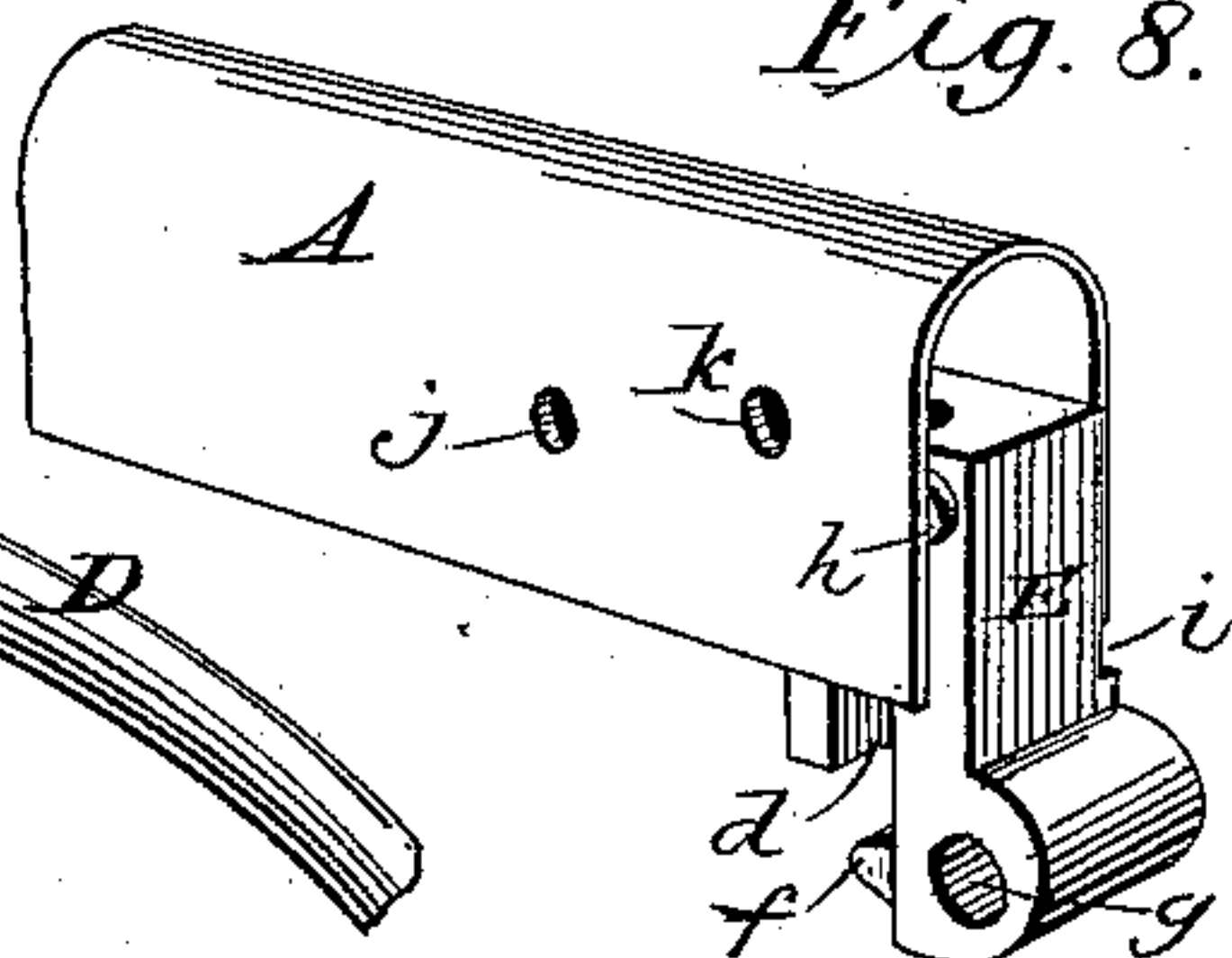
*Fig. 7.*  
on y-y



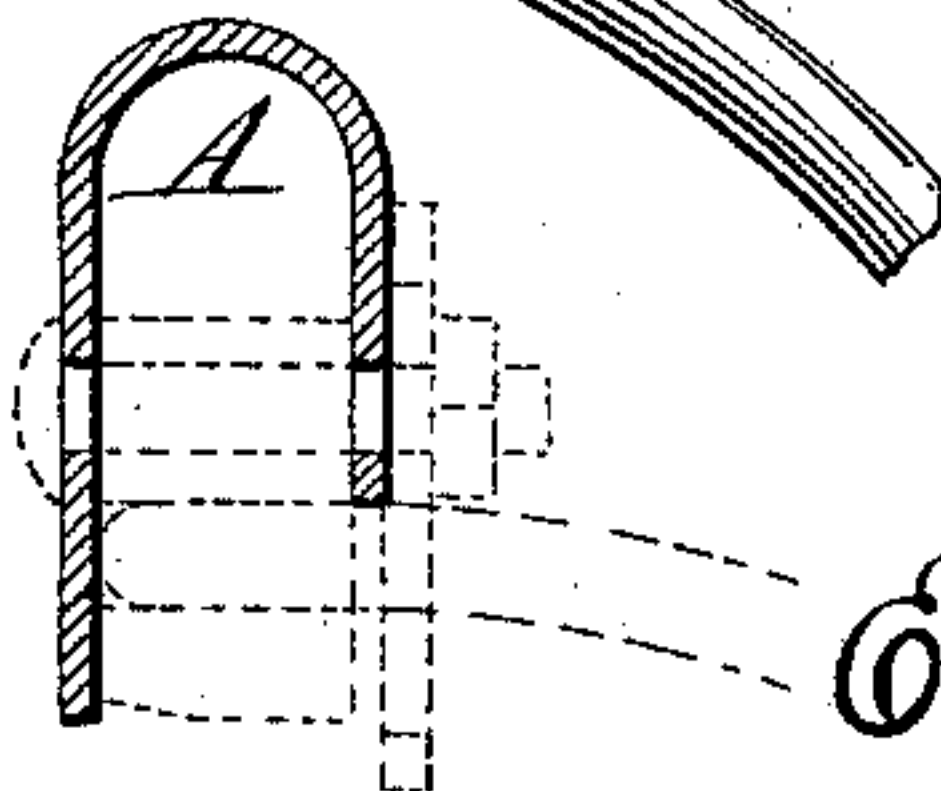
*Fig. 5.*



*Fig. 8.*



*Fig. 9.*



Attest.

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*By his attorney,*  
*Philip T. Dodge.*



# UNITED STATES PATENT OFFICE.

EDWARD P. LYNCH, OF DAVENPORT, IOWA.

## HORSE HAY-RAKE.

SPECIFICATION forming part of Letters Patent No. 387,172, dated July 31, 1888.

Application filed October 1, 1884. Renewed November 21, 1887. Serial No. 255,784. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD P. LYNCH, of Davenport, in the county of Scott and State of Iowa, have invented certain Improvements in Horse Hay-Rakes, of which the following is a specification.

This invention relates to that class of rakes wherein an axle sustained by wheels at its ends is provided with a series of rake-teeth extending backward and downward therefrom.

The invention relates to a metal axle of improved form and construction, to the manner of securing the journals for the ground-wheels thereto, and to an improved device for connecting the forward ends of the rake-teeth with the axle.

Referring to the accompanying drawings, Figure 1 represents a rear elevation of one end of my improved axle with two rake-teeth applied thereto, the two ends of the axle being constructed in duplicate. Fig. 2 is a longitudinal vertical section through the center of the axle and its connections. Figs. 3 and 4 are vertical cross-sections on the lines *v v* and *ww*, respectively, illustrating the manner in which the journal or axle proper is secured to the axle-body. Fig. 5 is a perspective view of one of the bearing-plates by which the rake-teeth are connected to the body of the axle. Figs. 6 and 7 are vertical cross-sections on the lines *x x* and *y y*, respectively, illustrating the manner in which the teeth are connected with the axle. Fig. 8 is a perspective view illustrating the manner in which the bearing-blocks are inserted into the axle. Fig. 9 is a vertical cross-section of the rake-head, showing the tooth and bearing-plate in dotted lines.

Referring to the drawings, A represents the body portion of the axle, constructed of a single sheet of wrought-iron or steel or other suitable metal, folded longitudinally into a  $\cap$  form, the lower edges being brought to the same horizontal plane, as represented in Figs. 1 to 7, or the forward edge being carried below the other, as represented in Fig. 9. For reasons which will hereinafter appear, the first-mentioned form is preferred, and the accompanying specification relates more particularly to a rake in which such form is employed.

To each end of the axle, constructed as above,

I attach firmly-projecting journals or spindles B, designed to receive the main wheels C, by which the axle is carried. The journals B are preferably made of round iron of suitable diameter to fit snugly within the axle. Each of the journals is secured by means of a vertical bolt, *a*, and a horizontal bolt, *b*, extended through the lower edges of the axle immediately beneath the journal, the bolt *b* being tightened in such manner as to hug the sides of the axle firmly upon and against the journal. If desired, additional bolts or bolts differently applied may be used to secure the journal in place; but the construction represented is preferred on account of its simplicity and cheapness.

D represents the rake-teeth, of which there will be any suitable number, each consisting of a curved or hooked body portion, each having its forward end, *c*, bent horizontally at a right angle to the body for the purpose of forming a journal to retain the tooth in place, teeth of this construction being commonly employed in the art at the present day.

For the purpose of attaching the teeth to the axle, I provide for each tooth a block, E, such as represented in Fig. 5, made of suitable size to fit snugly within the axle. Each block is provided, as shown in the drawings, with a horizontal groove, *d*, in its forward face to receive the journal *c* of the tooth, and with a groove or recess, *e*, extending thence backward through the rear face of the block to receive the body of the tooth, which extends rearward through the same. Each block has at one end a dependent lip, *f*, to engage over the body of the tooth and hold the same against lateral motion. Through the upper portion of each block I form a hole, *g*, to receive a fastening-bolt, as hereinafter explained, and on the opposite end of the block I form a forwardly-extending stud, *h*, designed to enter a corresponding hole in the axle to assist in retaining the block in position. In order to admit of the insertion of this stud from the interior of the axle and at the same time have the block of such width that when in position it will fill the axle from side to side, the block is cut away on the back or reduced in thickness opposite the stud, as shown at *i* in Fig. 8. In ap-



plying the block this reduced end is inserted in a forward direction from the bottom of the axle, as plainly represented in Fig. 8. The reduced portion is of such length as to admit of the stud passing upward within the axle to a point opposite an opening, *j*, therein. The stud is seated in this hole by pressing the block forward, after which the block is turned or swung upward until its opposite and thicker end is seated firmly within the axle, its rear face bearing firmly against the interior of the axle, so that the escape of the stud from its seat is prevented.

To permit the insertion of the blocks, the teeth, and the fastening-bolts, the axle is provided with holes *k*, extending through both sides, with notches *l* in the rear side, beneath the holes *k*, to admit the bodies of the teeth, and in the forward side with the before-mentioned holes *j* to receive the studs upon the blocks.

In assembling the parts each tooth has its journal seated, as before described, in one of the blocks *E*, either before or after the stud of the block is inserted in its seat in the axle, after which the block is swung upward to its place and a fastening-bolt, *G*, is inserted through the axle and the block in the manner plainly represented in Fig. 6, whereby the block is retained in position and the teeth confined between the block and the axle in such manner that while its escape is prevented it is permitted to swing freely in a vertical direction at the rear end.

It will be observed that each tooth is secured independently of the others, and that it may be detached at will without the removal of other parts than its individual block and bolt. In order to provide for a limitation of the vertical motion of the tooth and to admit of the tooth being locked, when required, against vertical motion, I apply around each tooth against the rear side of the axle a vertical slotted plate, through which the bolt *G* passes, arranged to encircle and hold in place the bolt *G*. By loosening the bolt a vertical adjustment of the plate is permitted, and by such adjustment a limited play of the tooth in a vertical direction may be permitted, or the tooth locked in its uppermost position, so that it will have no vertical play except such as may result from its flexibility.

While it is preferred to construct the rake, as above described, with the notches *l* in its lower edge to guide the teeth and prevent their lateral movement, the construction presented in Fig. 9 may be adopted, the lower edge of the axle being terminated at such height as to admit of the teeth passing freely thereunder without the formation of the notches therein. When the latter construction is adopted rolls must be placed laterally upon the blocks *E*, to prevent the lateral movement of the teeth.

It is to be understood that the frame of the rake and the appliances for operating and

controlling the teeth may be of any ordinary construction, the various arrangements commonly known in the art being adapted for use in connection with my improvements.

The present invention is restricted to those matters and things which are hereinafter claimed, and as to all matters which may be described or shown, but which are not claimed, the right is reserved to make the same the subject of a separate application.

Having thus described my invention, what I claim is—

1. As a new article of manufacture, the rake-head constructed of a single sheet or plate of metal of an inverted-**U** form in cross-section.

2. In a rake-head, the combination of the metal axle of an inverted-**U** form in cross-section with the journals secured to and extending beyond its ends, substantially as described, to receive the ground-wheels.

3. In combination with the rake-teeth attached thereto, substantially as described, the rake head or axle consisting of the body portion of an inverted-**U** form in cross-section, and journals *B*, seated at one end within the axle and confined in place by bolts *a* and *b*, substantially as described.

4. In a horse-rake, the combination of a **U**-shaped axle, blocks secured within said axle, and rake-teeth having their forward ends seated in said blocks, substantially as described and shown.

5. The combination, with the **U**-shaped axle, the tooth-retaining block *E*, provided with stud *h*, and the fastening-bolt inserted through the block and axle, substantially as described.

6. In combination with a series of rake-teeth attached thereto, substantially as described, the axle having its body portion of an inverted-**U** form in cross-section, journals *B*, seated at one end within the axle, and transverse bolts *b*, extended through the axle and acting to contract the same upon the journal.

7. The axle of an inverted-**U** form in cross-section, provided with holes *k* and vertical notches *l*, whereby it is adapted for use in a horse-rake, as described.

8. In combination with the hollow axle and the rake-tooth having its forward end bent at a right angle to form a journal or pivot, a grooved perforated block, *E*, seated within the axle and embracing the end of the tooth, and a bolt applied to confine the block in place, substantially as described.

9. The axle of an inverted-**U** form in cross-section, in combination with the rake-tooth having a laterally-bent end or journal, and the grooved block embracing said journal.

10. The grooved block *E*, provided with the stud *h* and reduced in thickness at the end bearing said stud, as and for the purpose described.

11. In combination with the axle of an inverted-**U** form in cross-section, provided with

recesses *j* and holes *k*, the tooth-retaining block *E*, provided with stud *h*, and the fastening-bolt *G*, applied as described and shown.

12. In combination with the hollow axle,  
5 the rake-tooth, and the tooth-retaining block within the axle, the vertical movable plate *H*, and the transverse bolt *G*, applied as de-

scribed, for the double purpose of retaining the block in position and of securing the plate.

EDWARD P. LYNCH.

Witnesses:

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H. C. FULTON.