

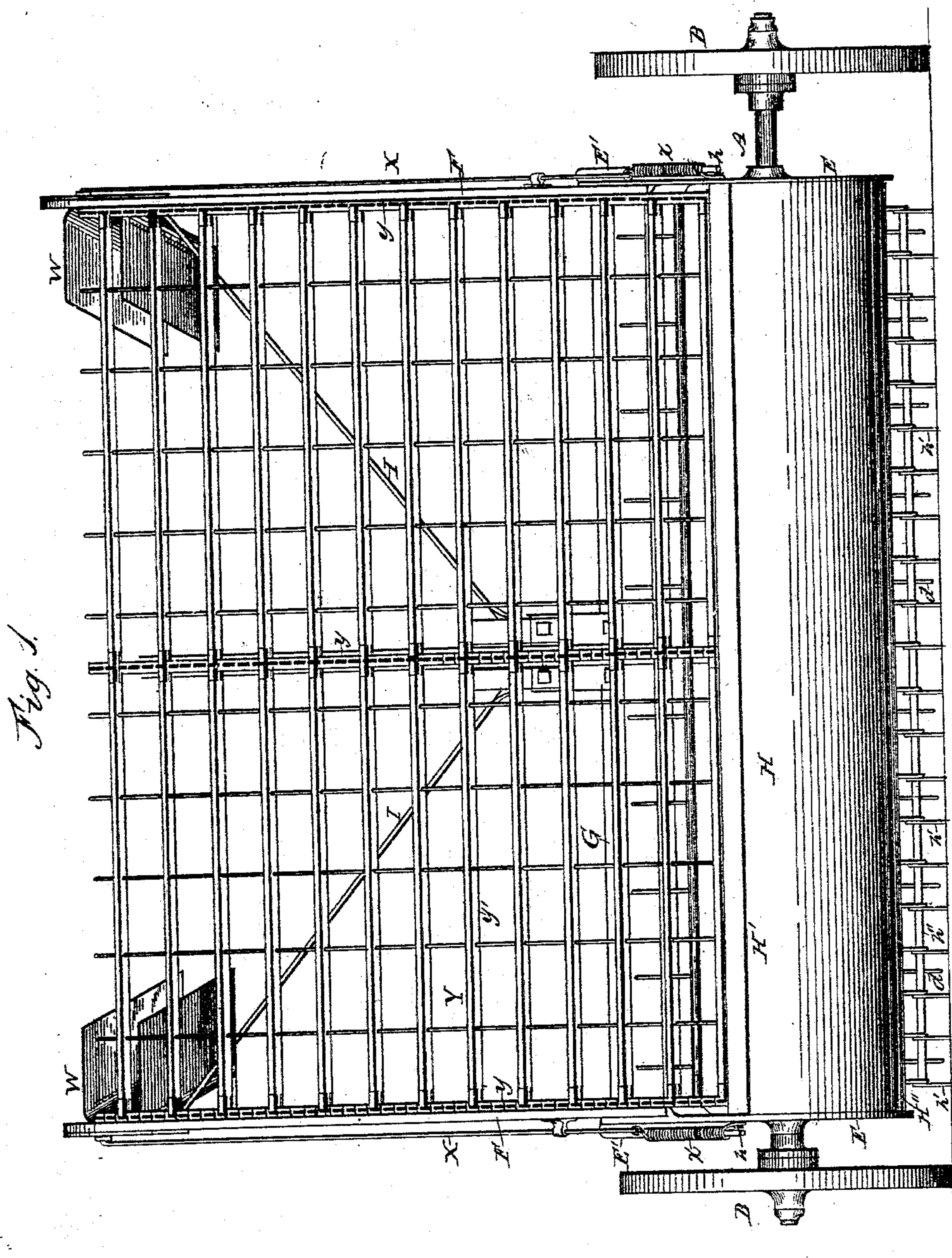
(No Model.)

4 Sheets—Sheet 1.

S. FERGUSON.  
HAY LOADER.

No. 510,965.

Patented Dec. 19, 1893.



Attest

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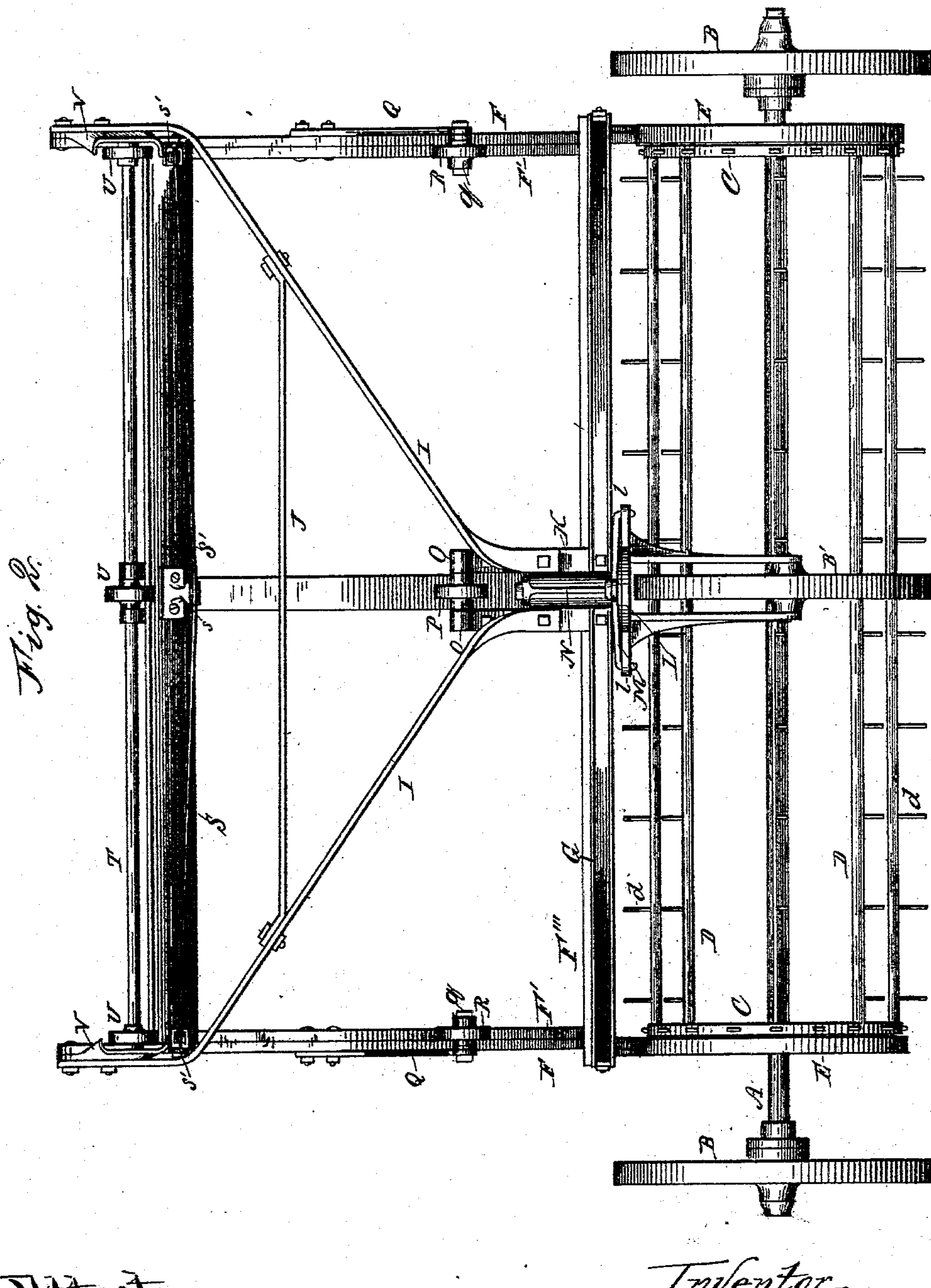
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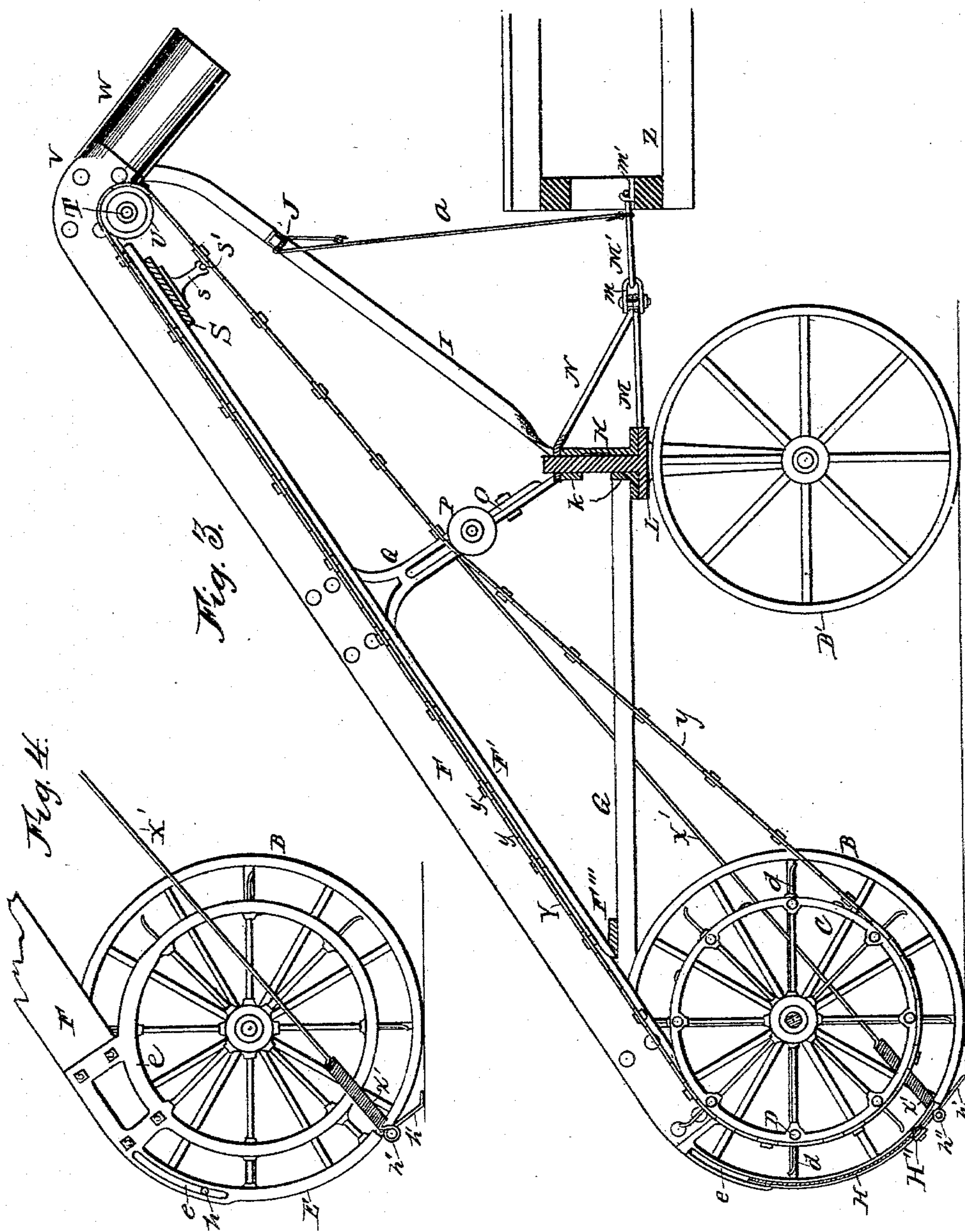
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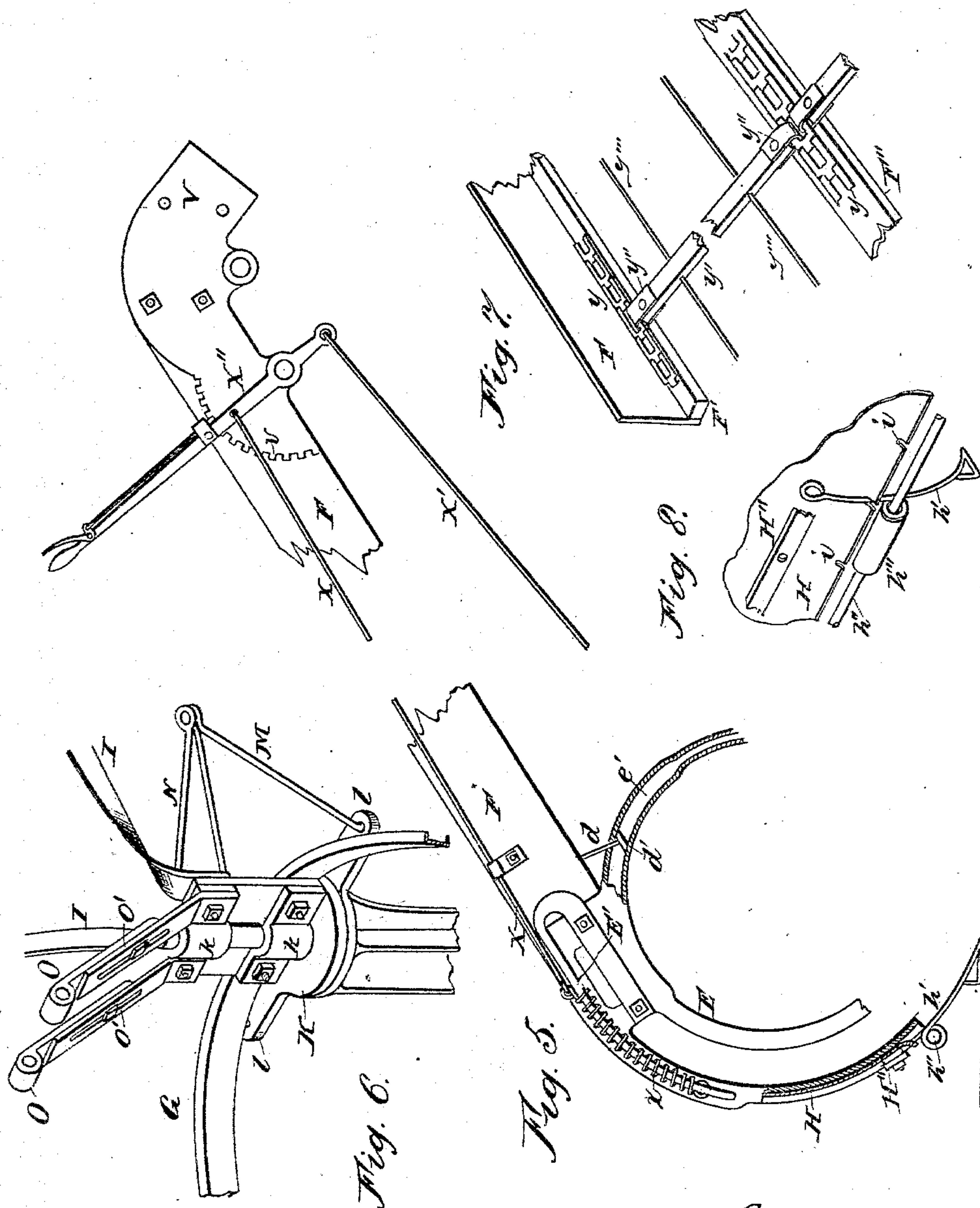
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# UNITED STATES PATENT OFFICE.

SAMUEL FERGUSON, OF CEDAR RAPIDS, IOWA.

## HAY-LOADER.

SPECIFICATION forming part of Letters Patent No. 510,965, dated December 19, 1893.

Application filed March 20, 1893. Serial No. 466,951. (No model.)

*To all whom it may concern:*

Be it known that I, SAMUEL FERGUSON, a citizen of the United States, residing at Cedar Rapids, in the county of Linn and State of Iowa, have invented certain new and useful Improvements in Hay-Loaders; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to that class of hay-loaders in which the hay is raked from the swath, and carried up and deposited on the wagon by the combined action of a revolving toothed cylinder and endless carrier.

The invention consists in various improvements in the hay-loader for which Letters Patent No. 488,732 were granted to me on the 27th day of December, 1892, all of which will be hereinafter fully set forth and claimed.

In the accompanying drawings, forming a part of this specification,—Figure 1, Sheet 1, is a rear view of a hay-loader embodying my improvements. Fig. 2, Sheet 2, is a front elevation of the same, but without the rake-hood, carrier, or chutes. Fig. 3, Sheet 3, is a central, vertical section of the same. Fig. 4 is a fragmentary side elevation, with one of the carrying wheels removed, showing the cylinder-cam and its connections. Fig. 5, Sheet 4, is a fragmentary elevation, partly in section, showing in fuller detail the construction of the cylinder cam, the rake, and means for regulating and operating them. Fig. 6 is a fragmentary view in perspective of the frame-support and pivot for the front wheel. Fig. 7 is a fragmentary view in perspective, showing the detail of the carrier. Fig. 8 is a similar view, showing details in the construction of the rake.

Similar letters of reference indicate corresponding parts.

Referring now to the drawings, A is the main axle, on which are mounted two drive-wheels B B, provided with the ordinary clutch device whereby the axle may be driven by either or both wheels. To this axle are secured three sprocket-wheels C C C, the middle one being shown in Fig. 3. These coact with the sprocket-chains y y y forming a part of the carrier, hereinafter to be described. Just outside of the two outer sprocket-wheels

two wheel-like castings E E are mounted loosely on the axle, the full circle of the castings corresponding to the sprocket-wheels, and the rearward segment (Figs. 4 and 5) forming bearings for the ends of the rake-hood H. To the upper portions of the castings are secured the side-boards F F of the elevator. At the upper end of the elevator is a shaft T on which are mounted three travelers U U U, aligning with the three sprocket-wheels before referred to. These travelers furnish the upper support for the chain-belts, to which the rest of the carrier is attached.

The forward end of the hay-loader is supported on a wheel B' by a framework connecting with the head-block K in which the fork L is pivoted. This frame consists in a pair of horizontal brace-bars G G, preferably of light but stiff iron or steel, such as channel-iron, bolted at the forward ends to the head-block, and at the rear ends to the sides of the elevator. It further consists in a pair of diagonal brace-bars or rods I I, bolted to the head-block at the lower ends, and at the upper ends to the upper and forward portion of the elevator. These should be trussed by a horizontal tie-rod J. In the construction of this frame it is desirable that the braces G G should be curved, as indicated in Fig. 6, so as to clear the carrier Y, which passes between them in its downward movement. They, as well as the braces I I may be secured to the head-block by the same bolts used in attaching the box-caps k k. The braces I I are preferably set edgewise in the line of draft, so that the greatest resistance is presented to the weight of the elevator. It will be seen in Fig. 3 that the braces are curved forward near the upper end. The object of this is to carry the bodies of the braces well forward, so that in building up the load of hay they prevent its being piled in the path of the descending carrier apron. The tie-rod J also serves the same useful purpose. The convergence of the two sets of brace-bars at the head-block, where they are rigidly secured, renders the frame extremely rigid, and this by a very simple construction and the use of but few parts.

The fork L is provided with two laterally extending lugs l l to which the divergent ends of a bail M connect. A brace N, having a



connection with the upper portion of the head-block, as by an eye through which the spindle of the fork passes, is connected at the forward end with the bail M, the pin of a clevis *m* passing through an eye in each. To the clevis is connected a draw-bar M', adapted to engage with a hook *m'* attached to the hay-rack Z. A cord *a*, or the like, passing up over the tie-rod J enables the operator to disengage the draw-bar while on the load.

To prevent undue sagging of the under side of the carrier apron, the chain-belts pass over three travelers P R R. These are mounted on supports which admit of an adjustment of the travelers as may be desired in taking up any slack in the apron. The bearings O O for the middle traveler are bolted to slotted supports O' O' secured to the head-block. The travelers R R are mounted on suitable studs *q q* fixed in slotted brackets Q Q attached to the sides of the elevator.

In the sprocket-wheels before referred to is mounted a series of shafts D D, provided at intervals with teeth *d d*. These teeth are normally held radial by the flattened ends of the shafts *d'*, which move in a groove on the inner side of the cam-ring E, as described fully in my said former patent. At *e* there is a widening of the groove, by which the teeth are permitted to tilt backwardly, so as readily to free themselves from the apron in its upward movement.

In my former machine the transverse slats *y' y'* of the carrier, in their movement over the cylinder C, lay just forward of the picker-teeth, the carrier being in fact moved forward by the pressure of these teeth on the back sides of the slats and by the friction of the cylinder-heads. In practice, however, it is desirable that the teeth and connecting shafts be relieved of all strain except what is due to the carrying upward of the hay, since any considerable pressure tends to produce undue friction in the annular grooves of the cam-rings. To this end I provide sprocket-wheels to carry the carrier independently of the picker-shafts or teeth, the slats of the carrier being adjusted with relation to the sprocket-wheels, in which the picker-shafts are journaled, so that the teeth are at all times at some distance from them.

It will be evident that the spaces between the slats of the carrier and the distance between the teeth of the sprocket-wheels should have an exact relation, so that the relative position of the picker-teeth remains uniform. The construction of the carrier, as will be seen hereinafter, is such that this result is accurately attained.

Referring to Fig. 7, it will be seen that the carrier is composed of longitudinal chain-belts *y y* and cords *y''' y'''*, and transverse slats *y' y'*. These slats are secured directly to the chains by straps of thin iron *y'' y''* passing through links of the chain-belt and

fastening to the ends of the slats. Exact uniformity of separation of the slats is secured by making the number of intervening links uniform. The sprocket-wheels are made so that no teeth engage with the links to which the slats are fastened, which may be easily done by spacing the teeth for only every second, third, or other desired link of the chain-belt.

An improvement in the apron consists in making it in two sections, as indicated in Figs. 1 and 7, the middle connection being a chain-belt. Owing to the great width of these machines the tendency of the apron to sag in the middle is very great, so that to secure the requisite strength the slats and other parts must be unduly heavy and strong. This difficulty I obviate in the manner shown, since by making the slats only half the usual length they may be made much lighter with the same relative strength, and by the use of a middle chain-belt positively operated, the middle part of the apron is always kept at the same level as the sides.

To prevent sagging or twisting of the chain-belts at the sides or middle I provide the elevator with supports for them. The side-boards F are provided with ledges F', and for the middle chain I provide a longitudinal bar F''. This is supported at the lower end on a suitable cross-bar F''', and at the upper end rests on a truss, as shown in Fig. 2. This truss is composed of the cross-piece S, a central bridge-block *s*, terminal lugs *s' s'*, and a truss-rod S' passing through the terminal blocks and over the bridge-block, and adapted to be strained in the usual way.

An improved chute for the hay as delivered at the upper end of the carrier is shown in Figs. 1 and 3. This is a U-shaped spout placed at each side of the elevator, preferably at a converging angle, so as to throw the hay as far inwardly as possible, and made of light sheet metal or the like. The special advantage in this construction is that the closed outside of the chute prevents the hay being blown out of its path until dropped from the mouths of the chutes. These chutes W W are suitably fastened to the forward ends of the casting V, which is extended forward and angled for this purpose.

The rake consists of a series of teeth attached near the lower edge of a thin curved hood H, as described in my former patent. Certain improvements in this part of my machine will now be described. The hood should be provided with a stiffening head H', terminating in two studs *h h*, which pass through slots *e* in the casting E. These studs are connected to the lower end of a coil spring *x*, mounted to move freely on a curved guide E' bolted to the side of the elevator. To the upper end of the spring is connected a rod X, which at the upper part of the elevator is connected with a suitable hand-lever X''. By means of the segment *v* the lever may be set at any desired point. The spring is in its



nature both contractile and expansile, so that within certain limits it admits of that freedom of movement on the part of the rake which is desirable, as in passing over obstructions and the like. At the same time it is stiff enough to draw the rake up from the ground, or to press it firmly down to the ground, according to the position of the hand-lever. The rake is held to its work by the joint action of this spring and a spring  $x'$  connecting at each end of the rake with a rod  $h''$  passing through the coil in all the rake-teeth, which spring connects by a rod  $X'$  with some part of the elevator, as for example, the lower end of the hand-lever. It need not necessarily, however, be adjustable, as is desirable in the case of the other one.

In Figs. 5 and 8 are shown certain improvements in the construction and connections of the rake-teeth. The tooth  $h'$  is formed with an eye or the like at the upper end, whereby it is fastened to the hood by bolting through the same and the bar  $H''$ . In the middle portion is a coil through which is run a rod  $h''$ . The lower end of the tooth makes a short turn backwardly for a little distance, when it is turned up in contact with the body of the tooth. The tooth thus has a rounded forward end, and a shoe running practically level with the ground, and its liability to catch

in stubble and other obstructions is thereby greatly reduced. The teeth are held in true position on the rod by interposed thimbles  $h'''$ .

In order that the hay may not catch on the lower edge of the hood as gathered up by the teeth, the same is curved back slightly, and small notches  $i i$  made therein to receive the body of the rake-tooth.

Having thus described my invention, I claim—

1. In a hay-loader, the combination of a rake having a hood  $H$  and teeth  $h' h'$ , and laterally extending studs  $h h$ , the slotted guide  $E e$ , the spring  $x'$  and its connections with the forward part of the machine, the spring  $x$ , guide  $E'$ , rod  $X$  and hand-lever  $X''$ , substantially as and for the purpose set forth.

2. In a hay-loader, the combination of the hood  $H$ , teeth  $h' h'$ , rod  $h''$  and thimbles  $h'''$ , substantially as described.

3. In a hay-loader, the combination of the elevator  $F$ , the carrier  $Y$ , and the U-shaped, thin metal chutes  $W W$ , substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

SAMUEL FERGUSON.

Witnesses:

L. A. ST. JOHN,  
F. I. KUBICEK.