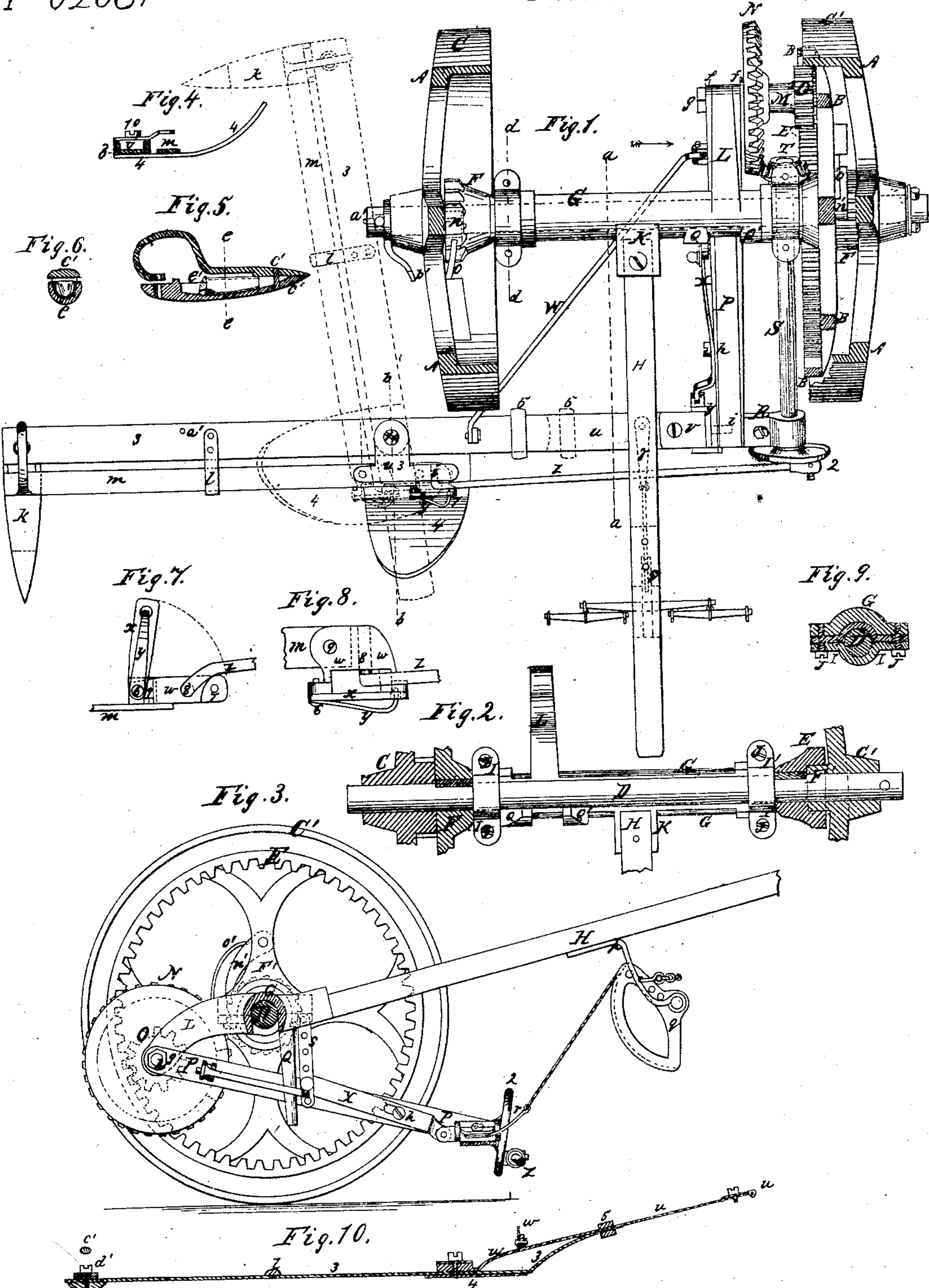


Mower.

Nº 62681

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Letters Patent No. 62,681, dated March 5, 1867.

IMPROVEMENT IN HARVESTERS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, JAMES PINE, of the city of Troy, county of Rensselaer, and State of New York, have invented a new and useful Improvement in Mowing and Reaping Machines; and I do declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, and to the letters of reference marked thereon.

My invention relates to the manner of supporting the gearing and cutting apparatus of a mowing and reaping machine; the manner of swinging around the cutting apparatus and supporting it when the machine is to be moved from place to place; connecting the driving power to the knife-rod in such a way that the cutting apparatus can be turned backward, and supporting it so as to be so transported without detaching the knife-rod from the connecting-rod or pitman; the improved manner of attaching the team to facilitate and lessen the draught of the machine; the method of adapting the cutting apparatus to uneven ground, and the improved manner of constructing the guard fingers, so as to avoid clogging, and a cheap and effectual way of plating the guard fingers, affording at the same time a good cutting edge and a means of escape for fibres of grass and other matter.

Similar letters of reference refer to similar parts in the different figures.

Figure 1 is a top view of the machine, with the wheels broken off at A, and the main driving or gear-wheel broken off at B.

Figure 2 is a top view of the axle and sleeve inverted, with a cross-section of the hubs of both driving-wheels, the main gear-wheel, and the ratchets.

Figure 3 is an end view of the machine taken on the line *a a*, fig. 1, and looking in the direction of the arrow.

Figure 4 is a longitudinal section, showing the main shoe, the finger-bar, the finger-bar extension piece, the knife-bar, the main knife-holder, and the bolt which holds the whole in their proper position, taken on the line *b b*, fig. 1.

Figure 5 is a longitudinal section of the outer or dividing shoe, and is a proper representation of the finger on an enlarged scale, the fingers being made on the same plan as the shoe and differing from it only in size.

Figure 6 is a cross-section of the dividing shoe on the line *c c*, fig. 5.

Figure 7 is an end view, showing the connecting piece between the pitman and knife-bar and a portion of the pitman, a portion of the connecting piece turned back in a position to remove the pitman.

Figure 8 is a top view, showing the connecting piece with the knife-bar and pitman broken off.

Figure 9 is a cross-section of the axle and sleeve, together with the cap and screws which fasten them together, taken on the line *d d*, fig. 1.

Figure 10 is a longitudinal section of the finger-bar, the finger-bar extension piece, main shoe, dividing shoe, and finger, with the bolts which hold them together.

To enable others skilled in the art to make and use my invention, I will proceed to describe the same with reference to the drawings.

Two main driving and supporting wheels, C and C', are mounted upon a common axle, D, and turn freely thereon. The inner hub F' of the main driving-wheel C' is furnished with ratchet-teeth. The main gear-wheel E is keyed fast to the main axle D, close to the hub of the main driving-wheel C'. The sleeve G, which supports the pole, with parts of the gearing, to be hereafter described, is made open upon the under side, and can be readily placed astride the axle, and is confined thereon by means of the caps I I', which, being secured to their places by means of the screws J J', form ordinary journal boxes around the axle D, allowing the axle D to turn freely therein. By this arrangement the axle can be removed without displacing the gearing. The pole H, by which the machine is drawn, is firmly bolted in the socket K, cast upon the sleeve G, cast upon the sleeve piece, and extending rearwards and curving downwards is the projecting arm piece L. M is a short shaft or stud, which is fastened to the rear end of the projecting arm piece L, and is fixed in a position parallel with the main axle D. The bevel-wheel N and spur-pinion O are cast together, or are otherwise rigidly connected, and turn freely on the shaft or stud M, the spur-pinion O working in the main gear-wheel E. Upon the shaft or stud M is pivoted or hinged the rear end of the swinging-bar P. This swinging-bar, at its rear end, is formed with two prongs or ears, which are placed astride the curved arm piece L, as shown at *ff*, fig. 1. The shaft M

is placed through holes in reach of the prongs or ears of the swing-bar P and the end of the curved arm piece L, the gears N and O having been previously slipped on, and is firmly held to its place by means of a nut, as shown at *g*, figs. 2 and 3. The swinging-bar P, being pivoted at the rear end of the curved arm piece L, extends forward under the axle, and its forward end is free to vibrate in a circle up and down around the shaft M as a centre. This swinging-bar is prevented from vibrating or swinging laterally by passing between two arms or prongs, Q and Q', cast upon and extending downwards from the sleeve, which arms or prongs serve as guides to the swinging-bar P. Upon each end of this swinging-bar is cast a projection, one of which is shown at R, fig. 1, which are furnished with suitable boxes or bearings, in which the crank-shaft S turns. This crank-shaft S is driven by the bevel-gear N, working into the bevel-pinion T. The lower end of the crank-shaft is furnished with a balance-wheel with a wrist-pin, and drives the knife in the ordinary manner. On the inner or grass side of the swinging bar P, and near the lower or front end thereof, is attached the finger-bar connecting piece U, by means of the hinge V; and near the upper end of the swinging-bar P is hinged the diagonal brace-bar W, which is hinged at its lower end to the finger-bar connecting piece U. This diagonal brace-bar W supports the finger-bar from back thrust. To the swinging-bar P is attached, in front of the axle D, the lever X, having its fulcrum at *h*. The uses of this lever will be more fully explained hereafter. Thus it will be seen that the swinging-bar P serves to carry the crank-shaft and its attachments, the end of the finger-bar extension piece U, and the fulcrum for the lever X. The hinge V is fastened rigidly to the end of the finger-bar extension piece U, and is connected to the swinging-bar P by means of an intermediate coupling piece Y. This coupling piece Y is so attached to the swinging-bar P by the bolt *i* as to allow the finger-bar extension piece, and consequently the finger-bar, to turn upon its longitudinal axis, or, in other words, to rock or roll in the line of its length, the bolt *i* being the centre of motion. The pitman *z* is connected to the balance-wheel 2 by a universal-joint connection, and to the knife-bar connecting piece by a simple hook. This universal-joint connection of the pitman with the crank-pin is rendered necessary by the varying positions of the swinging-bar P, and by means of its jointed connections, the varying positions of the finger-bar and cutting apparatus with reference to a horizontal plane. The finger-bar, and its connection with the machine by means of the finger-bar extension piece, is shown in the longitudinal section, fig. 10. 3 is the finger-bar, extending from the dividing or outer shoe past the main shoe 4, and then turns up and is clamped snugly to the finger-bar extension piece U, by means of the link 5. This link is a rectangular piece of metal made to fit over the end of the finger-bar 3 and the extension piece U. The end of the finger-bar being slightly tapered, the link can be slid backward or forward, and thus clamping or unclamping the finger-bar and the finger-bar extension piece at the will of the operator. *m* is the knife-rod to which the cutters are attached. *l* is one of the pieces fastened to the finger-bar to keep the knife-rod in place. The hub of the main driving-wheel C' being made with ratchet-teeth, when the machine is drawn forward, communicates motion to the main gear-wheel F by means of the pawl, which is fastened to the main gear-wheel and is held in gear with the ratchet by the spring *o'*. The main gear-wheel being fast to the main axle, communicates motion to it, and also gives motion to the spur-pinion O and the bevel-gear N. The bevel-gear N imparts motion to the bevel-pinion T, and through it to the crank-shaft S, and thereby to the knife. The driving-wheel C is furnished with a pawl, *n*, and spring, *o*, which, in a similar manner, gives motion to the ratchet F. This ratchet is keyed fast to the axle D, so that when the machine is drawn forward the driving-wheel C gives motion to the axle, and through it to the other parts of the gearing of the machine. It is plain that when the machine is backed the pawls will not take into the ratchets, and motion will be given to the driving-wheels only. Upon the under side of the pole H, and a suitable distance in advance of the cutting apparatus, is fastened the forked hanger *p*. Upon the lower end of this hanger is pivoted the sector *q*, at its centre in a vertical position, with its arc towards the cutting apparatus. The arc of the sector is furnished with a score, which carries a flexible cord or chain. One end of this cord or chain is fastened to the front upper end of the arc, and the other end is attached to the finger-bar extension piece by means of the metallic connection *r*. The upper radius of the sector is perforated by a row of holes, from near the centre to the arc, and the double-trees to which the team is attached are fastened in either these holes, as the circumstances of the case require. The object of this mode of attachment is to convey a portion of the power required to draw the machine direct to the finger-bar, and thereby lift the bar sufficiently from the ground to relieve it of friction, and also to obtain a lower line of draught than is ordinarily attained in mowing machines. By this arrangement the power required to draw the machine can be divided between the pole and the finger-bar and its connections, and graduated between the two to suit the circumstances of the case. It is plain that the nearer the centre of the sector the double-trees are attached the greater is the draught expended on the pole and the less on the finger-bar extension piece and *vice versa*. By the use of the sector as here arranged, a certain portion of the draught will always be upon the finger-bar and tend to raise it, both upon level ground and when the cutters are passing over knolls or elevations, as the point of attachment of the cord or chain to the sector is always above the plane of the finger-bar extension piece, and the line of its draught must be always in an upward direction. In machines of this class one of the objections, in practice, has been found to be in crossing furrows, which often occurs, running in a direction perpendicular to the path of the machine. When the finger-bar and cutting apparatus drop down into one of these depressions or furrows the points of the fingers have a tendency to pierce the soil upon the up-hill side of the furrow, and cause a sudden strain, both upon the team and machine, in getting out of the furrow. It is to overcome this objection that the lever X, before alluded to, is used. Upon the sleeve G, and near the top of the inner guide piece Q, is cast an ear. To this ear is hung loosely the perforated bar *s*. In either of the holes in this perforated bar the upper end of the lever X is fastened by a screw-bolt. The lower end of the lever X is pivoted to the connecting piece V, and near its centre is pivoted to the swinging-bar P at *h*, with a screw, *h*, for a fulcrum. It is plain that when the finger-bar and cutting apparatus encounter one of these furrows they will drop down vertically, and as soon as this vertical motion takes place, the lever X, being dropped

down at its forward end, together with the finger-bar, and being fastened at its upper end to the perforated bar, must turn upon its fulcrum *h*, and thereby depress the back edge of the finger-bar, and raise proportionately the points of the fingers, and thus cause the finger-bar and its extension piece to turn upon its longitudinal axis. This feature is self-acting, and the desired result is accomplished without the aid of the operator of the machine. A seat for the driver, and also a lever arrangement by which the driver can elevate the finger-bar and cutting apparatus at his will, are used upon the machine. I have not deemed it necessary to show them upon the drawings, as it is accomplished in the same manner as upon my previously patented machines. When it is desired to move the machine from field to field, the pawls *n* and *n'* are thrown out of connection with their corresponding ratchets by means of the springs *o* and *o'*. The link 5 is slipped along the extension piece to the position as shown in red ink, fig. 1, and thereby the finger-bar and the extension piece are disconnected. The finger-bar and cutters, together with their connection, having been previously raised up by the driver, the finger-bar and cutting apparatus will turn freely backward upon the pin 10, figs. 1 and 4; and by means of the swivelled connection of the finger-bar extension piece with the swinging-bar *P*, upon the bolt *i*, the said bar and cutting apparatus are moved back and in a plane inclined upward to the horizon, and are supported above the axle by means of the supporting piece *b'*, the hole *a'*, in the finger-bar, fitting over the end of the piece *b'*. The connecting piece between the pitman *z* and the knife-rod *m* is so constructed as to allow the finger-bar and cutting apparatus to be turned backward, and also returned to its place for work without disconnecting the pitman from the knife-rod. This connecting piece, figs. 7 and 8, is made of a separate piece of metal, *w*. A vertical hole, 9, passes through this vertical piece, through which passes the pin which is attached to the knife-rod *m*, and this pin serves to convey motion from the connecting piece *w* to the knife-rod, and is sufficiently loose to turn in said hole. A horizontal hole, 8, also passes through the connecting piece, which receives the end of the pitman. A latch, *x*, provided with a spring, *y*, turns freely upon the bolt 6 as a centre. The object of this latch is to hold the end of the pitman in its place, it being confined there by the action of the spring *y*. When it is required to remove the knife, the latch is raised up, as shown at fig. 7, and the end of the pitman can be readily slipped out, the upper end being provided, as before stated, with a universal joint. The connecting piece *w* is held down by means of the thin piece *a''*, which projects over the connecting piece *w*, and is long enough to cover it during the whole length of the vibration of the knife. By this means this end of the knife-rod and pitman is held down and guided. The dividing shoe *k*, as shown at figs. 1, 5, and 6, is a proper representation of the shoe as well as the guard-fingers, the only difference being in point of size. The shoe and guard-fingers are made in two parts. The lower part *c* is made of malleable iron. The upper part *c'* may be made of other metal. The two are united together at *c'* near the point. The upper portion *c'* of the guard-finger extends back from its point of connection with *c*, affording a support for the material to be severed sufficiently above the lower portion to allow the free passage of the cutter between the upper and lower portion of the finger, and until it reaches a point immediately over the front edge of the knife-rod, is of a width corresponding with width of lower portion. At this point the upper portion is reduced in size, and to a round form, or nearly so, as shown at *c'*, in fig. 10, and bends suddenly upwards, and is elevated above the cutter-bar, and extending upwards and backwards, and near the rear of the finger-bar bows down, as shown at fig. 5, and is fastened to the finger-bar by the bolt *d'*, which bolt also serves to hold the guard-finger to the finger-bar. The lower portion of the finger is cast with a depression or is hollowed out, from just in front of the cutter to near the front edge of the finger-beam. This is plainly shown at figs. 5 and 6. At *e*, fig. 5, a small knob or projection is cast, which extends from the lowest part of the hollow of the guard-finger upward, and its front edge is just in rear of the front edge of the knife-rod. Within the depression of the lower part of the guard-finger, and immediately in front of the knob *e*, is fitted a steel plate, which completely faces that portion of the guard-finger against which the cutter works. This steel facing may be easily formed under swedges and be made to fit to its place. The edge of this steel plate is thus presented as a ledger plate for the cutters to cut against. The plate is held in place at the forward end between the upper and lower portions of the guard-finger, and at the back end by the knob *e*, the knob *e* having been bent over forwards, as shown in fig. 5, which can be readily done with a hammer. The portion of the guard behind the knob *e*, and nearly up to the finger-bar, is left hollowed out for the free escape of the fibres of grass or other foreign material which may be drawn under the knife.

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

The use of an open sleeve, upon which is suspended the gearing to drive the knife, and the attachment to hold the cutting apparatus when said sleeve is furnished with journal boxes, substantially as and for the purposes set forth.

I also claim the use of the swinging-arm *P*, when hinged at its rear end to the projecting portion *L* of the sleeve, and when said arm supports the gearing and cutting apparatus, substantially as described.

I also claim the use of the downward projecting arms or guides *Q*, *Q'*, and the rearward projecting arm piece *L*, in combination with the open sleeve, substantially as described and for the purposes set forth.

I also claim the combination of the hinge *V*, the coupling piece *Y*, and the lever *X*, substantially as and for the purposes set forth.

I also claim the use of a graduated sector-shaped draught-bar, when both the cord or chain and double-tree or team are united to it above its pivoted point, substantially as and for the purposes set forth.

JAMES PINE.

Witnesses:

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R. A. PARMENTER.