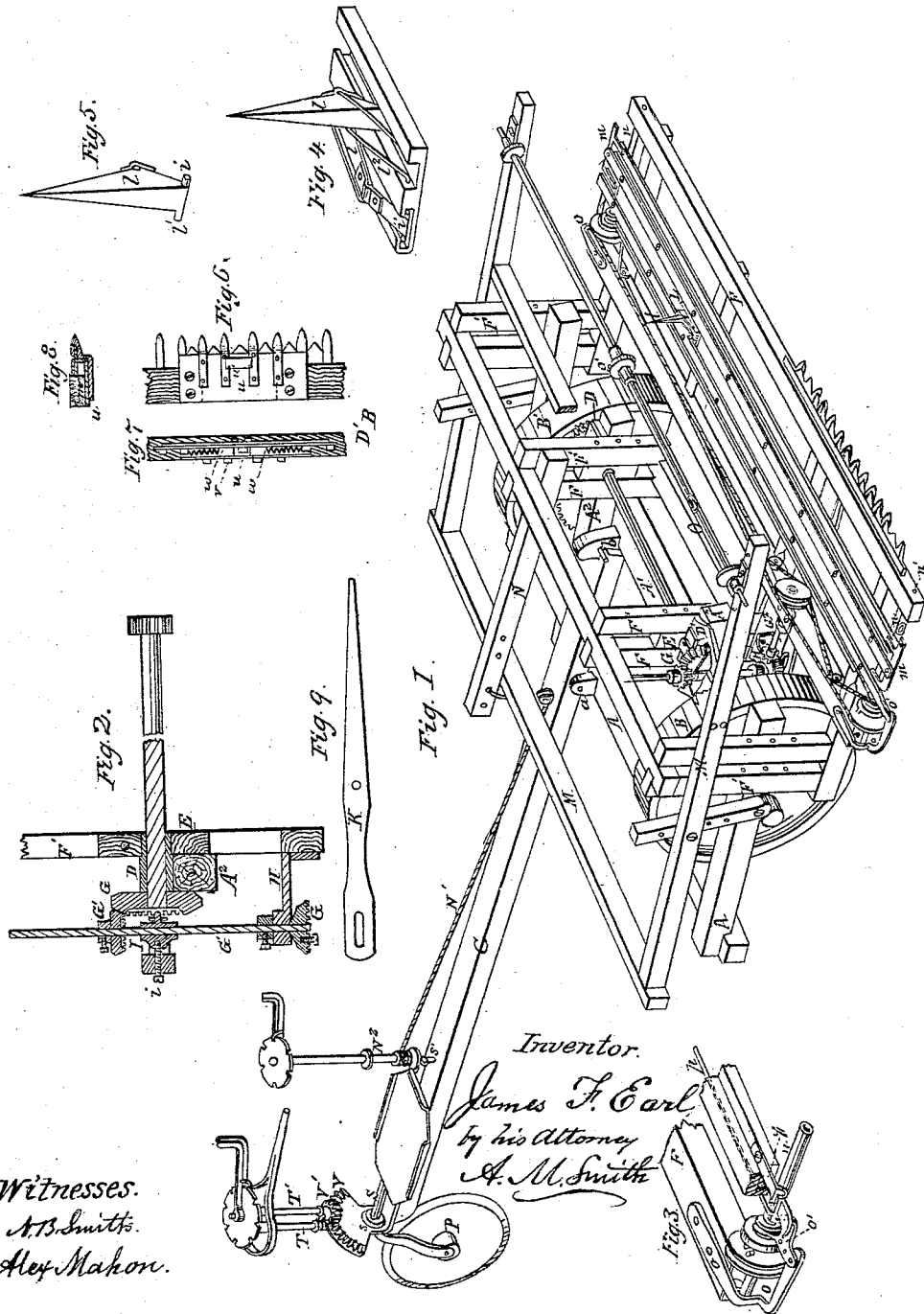


J. F. EARL.

Harvester.

No. 83,839.

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Letters Patent No. 83,839, dated November 10, 1868.

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 F. EARL, of San Francisco, county of San Francisco, and State of California, have invented certain new and useful Improvements in Reaping-Machines; and I do hereby 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, in which—

Figure 1 is a perspective view of a harvesting-machine embracing my improvements;

Figure 2 is a vertical section in line with the bevel-wheel shaft, showing the arrangement of driving-gears, &c.;

Figure 3 is a perspective view of a part of the rake-gearing;

Figure 4 is a perspective view of one of the rake-heads detached;

Figure 5 is a similar view of one of the rake-teeth detached from the head;

Figures 6, 7, and 8 are detached views of a portion of the cutting-apparatus, showing the guard-plate or frame, &c.; and

Figure 9 is a plan view of the sickle-lever.

Similar letters, whenever used, refer to corresponding parts in all the figures.

My invention relates to that class of reaping-machines usually denominated "thrust"-machines, from the fact that the team, by which the machine is propelled over the ground, is arranged behind the cutting-apparatus, and directly in the path thereof, instead of at the side or in front of the cutters, as in the ordinary "draught"-machines; and

It consists in a novel means of effecting the vertical adjustment of the cutting-apparatus and grain-platform without interfering with the action of the cutter and rake-actuating mechanism, as hereinafter set forth. Also, in the construction of the rake, and the arrangement of its actuating-mechanism.

It also consists in a novel manner of framing a portion of the guard-fingers, at the point of attachment of the sickle-driving lever, for enclosing the springs for relieving the jar of the cutters and permitting the removal of the sickle. Also, in the particular construction and manner of supporting and adjusting the reel-shaft.

It further consists in a novel adjustment of the guiding or steering-wheel relative to the main frame and cutters, for adapting the machine to hill-side work, as hereinafter set forth.

To enable others to understand and use my invention, I proceed to describe the same, with reference to the accompanying drawings, in which—

A represents a rectangular main frame, of any desired construction, and made either to enclose the main carrying and driving-wheels B B', as represented in the drawing, or arranged between the same, as may be preferred. In this instance, I have shown the forward transverse bar A' of the frame as constituting the main axle upon which the wheels B are mounted.

C is the pole or tongue, hinged or pivoted at *a* to the main frame, and extending forward of the pivot to a curved adjusting-guide, *b*, by means of perforations and a pin, in which the angle of relation of the tongue and frame may be regulated or set, as desired.

The longitudinal bars of the main frame project in advance of the axle A', and the two (A²) intermediate between the carrying-wheels, have mounted upon them the boxes D D', in which the bevel-wheel and pinion-shaft are mounted. These boxes are provided with tubular ears or projections embracing the said shaft, and forming bearings or supports for guide-blocks E which serve to support and regulate the adjustment of the cutter-frame, as hereinafter set forth.

The cutter-frame is composed of a horizontal framework, constituting the grain-bed or platform, to the forward edge of which the cutting-apparatus is connected, and upon and over which the rakes work, and of the upright framing F' F', embracing the blocks E, and adapted to be adjusted thereon for varying the height of the cutters from the ground to any extent that may be desirable or necessary. Instead of the construction represented, the forward ends of bars A² may be provided each with a clasp working over single uprights on the cutter-frame, or with a clevis working in grooved uprights, and secured at any desired height or point of adjustment by means of perforations in said uprights, and pins passing through the uprights and guide-blocks, as represented in the drawings. By this construction and arrangement the cutter-frame is adapted to be adjusted upon the bevel-wheel shaft.

The arrangement of gearing is as follows:

The drive-wheel B' has secured to it a large spur-wheel which meshes with and drives a pinion on one end of the bevel-wheel shaft, the opposite end of said shaft terminating in the box D, and being armed with the bevel-wheel G, as shown in figs. 1 and 2.

G¹ is a bevel-pinion and crank-shaft mounted at its lower end in a fixed bearing, H, attached to the cutter-frame, at or near the bottom thereof, and at its upper end in a swivelling box, I, mounted in bearings in box D', in line with the bevel-wheel shaft. An adjustable screw, *i*, which forms one of the bearings of the swivelling-box, serves to maintain the bearings of said box in proper relation to each other, and to compensate for wear. By this arrangement the two shafts G G¹ are kept in proper relation to each other, and, at the same time, the crank-shaft is allowed to roll around the bevel-wheel shaft as a centre, in the adjustment of the cutters and cutter-frame. Shaft G¹ is armed with a bevel-pinion which engages with the bevel-wheel, and is made adjustable upon its shaft, to adapt it to the adjustment of the cutter-frame, being maintained at the required point by means of a set-screw or other equivalent device.

The lower end of said pinion-shaft is provided with a crank and bevel-wheel, the former actuating the sickle-lever K, and the latter engaging with and driving a bevel-wheel on a horizontal shaft, G², through

which, by proper arrangement of pulleys and cords, or chains, as hereinafter set forth, the required reciprocating movements are imparted to the rake-heads L.

The cutting-apparatus may be of any usual or preferred construction; but instead of connecting the actuating-lever to one end of the sickle in the ordinary way, I prefer to connect it at a point at or near the centre of its length. For the purpose of connecting the lever and sickle in such manner, without obstructing the action of the latter, I frame a number of the guards, (say four, more or less,) upon a slotted metal plate, *u*, the form and arrangement of which are shown in the cross-section, fig. 8, in such manner as to form a box to enclose and permit end-play of the pendent staple V, through which the lever is connected with the sickle-bar. At the outer ends of the box are springs W, resting or abutting against the guards outside the framing, and acting upon the staple or lever at each end of its stroke to relieve the jar, and assist the sickle in starting upon the return stroke. The slot *u*, in plate, permits the removal of the staple when it is desired to take out the sickle for sharpening, &c.

The construction of the rake-heads L is shown in the detached view, fig. 4, the same consisting of grooved blocks of metal or wood, adapted to work or slide between parallel bars or ways on the cutter-frame, and provided with grooves or recesses, in which are placed the rake-teeth *l*. The teeth are provided at their heel-ends with projecting ears or pins *l'*, which work in grooves in the block or head L. Links *l''*, connected to the rake-heads and to the teeth *l*, serve to form a movable fulcrum upon which the teeth turn in being moved from a horizontal to a vertical position, and *vice versa*. The slots in the block, in which the tooth-pivots *l'* work are so arranged as not to permit the teeth to be moved beyond the vertical or nearly vertical position assumed by them when thrown up to remove the grain.

m are adjustable irons arranged at opposite ends of the platform, and armed with spurs, by the proper arrangement of which, so as to act upon the heel-ends of the rake-teeth, said teeth are thrown up for raking off the grain, and down for the return stroke, in a manner that will be readily understood. The rake-heads are reciprocated by means of belts or straps to which they are attached, the opposite ends of which are alternately wound upon and unwound from tubular drums *n*, mounted upon shafts *n'*.

These drums are feathered at their rear ends, and are provided with sliding clutches, which serve to engage them alternately with the shafts *n'*, or with oppositely-rotating sheaves thereon, said sheaves or shafts being driven by endless belts from a pulley on shaft G², above referred to.

O O are arms attached to the cutter-frame in rear of the rake-belts, and forming supports for bell-crank levers *o'*, armed with forks working in the collars or hubs of the clutches referred to. These levers are connected by a rod, *p*, in such manner that they are operated together, the one being thrown out when the other is thrown in for reversing the movement of the rake-belt, and are operated upon alternately by the rake-head as it approaches the end of its stroke in either direction.

By means of a joint and set-screw or screws at the angle of the bell-crank levers, the angle of the two arms may be adjusted for varying the point at which the rake-head acts on the said lever. A notched spring, *q*, at each end of the track, serves to properly hold the lever until acted upon by the rake-head.

The rake-head is shown provided with teeth adapting it to work in either direction, and to discharge the grain at either end of the platform, as may be desired; but where it is only required to discharge the grain at one end, one tooth in each rake-head may be dis-

pensed with. Any desired number of rake-heads may be used, arranged in line with each other, upon parallel belts traversing the platform, as shown and described.

M is a reel-frame pivoted to uprights on the main frame, at a point above and in rear of the bevel-wheel shaft or pivotal centre of the cutter-frame.

N is a lever connected to the cutter-frame, and extending over the rear transverse bar of the reel-frame. A cord or chain, N¹, connected to lever N and to the reel-frame, passes under a pulley on the tongue, and extends around a shaft, N², mounted thereon, within convenient reach of the driver, and operated by him for raising and depressing the cutters and reel, as required. The arrangement of the centres of vibration of said reel and cutter-frames is such as to produce a more rapid movement of the reel than of the sickle. By this arrangement the reel is better adapted to the condition of the grain, as where the grain is short, it is necessary to bring the reel down closely to the cutters in order to effect the proper reeling in of the same to the cutters; whereas, in long grain, such proximity of the reel would tend rather to thrust it from the sickle, and would also interfere with its proper deposition upon the platform.

The reel-shaft O is made of light tubing, or it may be made of sheet-metal, stiffened and strengthened by end-hubs and by a central sleeve or tube and hub, O'; or, if desired, light sheet-metal may be used, rolled upon and tightly secured to a light rod of wood, which will serve to stiffen and support the same. Said shaft is mounted on short stud-shafts on the reel-frame. The arms and beaters of the reel may be made in any desired or usual way.

The rear end of the tongue or pole O is mounted upon a guiding-wheel, P, mounted in arms *r r*, attached to the lower end of an upright shaft, the upper end of which is provided with a lever, R, within reach of and controlled by the driver, for guiding the machine. Said upright guide-wheel shaft has its bearings in a sleeve, T, attached to and turning with a horizontal shaft or pivot, S, mounted in bearings *s s'* or uprights upon the tongue. The rear bearing or upright *s* is extended above pivot or shaft S, and is provided with a curved rack, V, in which the teeth of a bevel-pinion, V', mounted on the lower end of an upright shaft, T', engage. Said shaft T' is supported in bearings attached to the sleeve T, and is provided with a crank-arm, by means of which the attendant is enabled to rotate the shaft, and thereby to turn the guiding-wheel upon its horizontal shaft or pivot S, in such manner as to adjust the wheel and maintain it in a vertical position, irrespective of the position of the main frame when working on level ground or upon the hill-side. The upper bearing of shaft V' is provided with a notched rack in which a spring-catch attached to the crank-arm engages for holding the guide-wheel at the desired point of adjustment.

I have shown the driver's platform, and the devices for raising and lowering the cutters and reel, mounted upon or connected with the horizontal pivot of the guide-wheel, so that as the latter is adjusted, the said platform is adjusted with it, and is maintained in a horizontal position, with devices for adjusting the cutters and reel kept in convenient relation thereto.

The advantage of this construction and arrangement hereinabove described will be readily understood. Heretofore it has been difficult, if not altogether impossible, with the class of machines herein described, to operate efficiently and satisfactorily upon the hill side, whereas, by my invention, this machine is not only adapted to the character of the surface over which it is propelled, but it is also adapted to be operated back and forth upon the same side of the grain, and in either direction to discharge the gavels at the stubble-end of the platform, thereby avoiding the necessity

of passing around a field of grain where the character of the ground might render such usual plan difficult or impracticable, and where, without my improvements, it would be necessary, after cutting across a field of grain, to return the machine, without operating it, to the point of starting, thereby causing much loss of time.

Having now described my improvements,

What I claim as new, and desire to secure by Letters Patent, is—

1. The vertical adjustment of the cutter-frame, relative to the main frame, upon a pivot or shaft, in advance of the main axle, by means and substantially in the manner described.
2. The arrangement of the driving-gear, in combination with the vertically-adjustable cutter-frame, substantially as described, whereby the height of said frame may be adjusted without disturbing the working relation of the gear-shafts.
3. The rake-head, constructed as described, in combination with teeth applied thereto, and operating substantially as described.
4. The manner of actuating the rakes by means of the straps or belts, and drums or rollers, and shifting-clutches, operating as described.
5. Operating the shifting-clutches, by means of the rake-head acting alternately thereon through the clutch-levers, as described.

6. The slotted plate, to which the middle fingers are attached, forming the box enclosing the springs, and permitting the withdrawal of the lever-staple and the removal of the sickle, as described.

7. The arrangement of the fulcrum of the reel-frame in rear of and above the pivot or axis around which the sickle-frame is adjusted, in combination with means for simultaneously adjusting said frames, whereby the relation of reel and sickle is varied when the height of cut is varied, as described.

8. The hollow reel-shaft, provided with the end-hubs and with the central stiffening-sleeve and central hub, as described.

9. The adjustment of the steering-wheel upon a horizontal axis or pivot, for the purpose of maintaining the same in a vertical position, irrespective of the position of the main frame and cutters.

10. The attachment of the driver's stand or seat and the sickle-adjusting mechanism to the horizontal axis upon which the steering-wheel is adjusted, substantially as and for the purpose set forth.

11. The combination, with the grain-platform, of a reciprocating rake, adapted to deliver the grain at either end of the platform, as set forth.

JAS. F. EARL.

Witnesses:

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