

UNITED STATES PATENT OFFICE.

IRVEN COPPOCK, OF ALBA, MISSOURI.

IMPROVEMENT IN GRADING-MACHINES.

Specification forming part of Letters Patent No. 185,500, dated December 19, 1876; application filed October 23, 1876.

To all whom it may concern:

Be it known that I, IRVEN COPPOCK, of Alba, in the county of Jasper and State of Missouri, have invented a new and Improved Grading-Machine, of which the following is a specification:

In the accompanying drawing, Figure 1 represents a plan view of my improved farming, grading, and ditching machine; Fig. 2, a sectional side elevation of the same; and Fig. 3, a detail side view of the adjusting mechanism of main frame on axle.

Similar letters of reference indicate corresponding parts.

The invention relates to an improved machine to be employed for farming purposes, grading streets and roads, cutting ditches of all kinds, breaking ground for railroad-cuttings, &c., and loading it at the same time directly on a wagon running in connection therewith.

The invention consists of an adjustable main frame supporting a plow that is raised and lowered thereon by suitable mechanism, and which throws, by a shovel or scoop-shaped mold-board, the earth on an endless belt that is placed at suitable inclination, and driven by pulley and chain connection with the axle of the main wheels.

In the drawing, A represents the supporting-frame of my improved farming, grading, and ditching machine, which is placed by standards A' and connecting bands on the axle of the wheels B. One of the standards A' is slotted to raise or lower the frame A on the axle by means of a cam, *a*, that swings on the axle, and bears against a flanged plate, *b*, of standard A', as shown in Fig. 3. The cam A is connected by a crank-rod, *d*, with a spring-acted crank-shaft, *e*, that is operated by means of a treadle from the driver's seat, so as to admit the adjusting of the main frame to the unevenness of the ground and retain it in horizontal position, or nearly so, at the different inclinations of the axle on sloping ground. As soon as the treadle is released the action of the spiral spring *d*¹ and rod *d*² carries the crank and cam back into normal position. The tongue is secured on the middle bar of frame A, when four horses are used, and bolted to a tongue-bar, C, that is

then applied by a support, *f*, and a spring-acted stirrup, *f*¹, at the hind end to frame A. The tongue-bar is made adjustable by means of top and bottom springs of stirrup *f*¹, so that the abrupt motions of frame and plow are not transmitted to and do not exert any injurious action on the horses' necks. The tongue and tongue-bar are shown in the drawing as applied to one side of frame A. The plow-beam D is pivoted to perforated front bars D' of frame A, and raised and lowered by a fulcrumed lever, E, that engages, by its circular end, a disk, E', moving along the inner circumference of the same. The disk E' is connected by pivot-pieces *g* with the plow-beam, and serves to raise or lower the same, according as the lever E is carried forward or backward. The lever E is locked by a sliding spring-bolt into position on an arc-shaped rack in the customary manner. If desired, the spring-bolt may be withdrawn, so as to clear the rack, to admit, when retained in this position, the free-playing up-and-down motion of the plow. The plow is provided with a shovel or scoop-shaped mold-board, F, that takes up the earth and conveys it back onto an endless belt or apron, G, when the plow is working. The apron G is stretched over concaved rollers *h* that are mounted on a frame, G¹, which is capable of adjustment to any suitable inclination on uprights *h*¹ of a truck-frame, G². The stretching-frame G¹ is braced, by stay-rods, to the truck-frame, and secured, by clamp-screws *h*², to the slotted uprights *h*¹. The truck-frame G² rests on swiveled wheels, so that it may be hitched to the plow-frame either at right angles or in the longitudinal direction of the same, or at any other angle, as desired. A brace rod or chain, *i*, connects the truck-frame G² and front of plow-frame A, while a bail, H, at the lower end of the apron-frame G¹, connects with a guide-sleeve, *l*, at the rear of the mold-board, and admits the adjustment of the apron-frame thereon. The lower part of the apron frame G is provided with a metallic shoe, H', that slides along the ground, the shoe being pivoted to the sides of the frame G, to accommodate itself to the ground over which the plow passes. The apron G is provided with concave buckets *m*, which, in connection with the concaved stretch-

ing-rollers, carry the earth in the center of the apron, as the same sags in the middle part. The apron G is moved by a spurred roller, *n*, and idlers *n'*, that bear on the top of the apron at both sides of the same. The driving-roller *n* of the apron is operated by pulley and chain connection, with a double pulley at the upper end of an inclined pulley-staff, I, and with a driving-pulley of the axle. The staff I is supported in an adjustable socket, I', applied, by pivot, slot, and clamp-screw, to a rigid downward-extending arm, A², of frame A, to which also the metallic guide-band for the rear end of the plow-beam is attached. The lower end of the pulley-staff I rests on a strong spiral spring in the socket, by which the chain is kept tight on the pulleys at any point. The pulley-staff I is further secured by an adjustable band to the middle bar of the frame A, where it may also be bent to form an angle to the lower part, so that in turning the staff into the direction at which the apron is adjusted, the chain will always be in right position to the driving-pulley of the same. The earth which is plowed up by the forward motion of the machine is taken up by the scoop mold-board and conducted onto the sagging-apron, which conveys it to a wagon that runs alongside or back of the apron. A number of wagons may be charged in succession with considerable rapidity, and thereby the grading,

ditching, and cutting of all kinds be accomplished with less hands, in less time, and in a more economical manner than with the common methods of removing the broken earth. By detaching the endless conveying belt and carriage from the plow-frame proper, the plow can be used for farming purposes in the customary manner.

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

1. The combination of frame A, having slotted standard A¹ and rigid flanged plate *b*, with a swinging cam, *a*, of axle, and operating crank-rod and treadle mechanism, to adjust frame to the slope of the ground, substantially as described.

2. The combination of the adjustable main frame, the scoop-shaped plow, and the inclined endless carrier, all arranged substantially as and for the purpose specified.

3. The combination, with an adjustable socket, having interior cushioning-spring of frame A, of a sliding pulley-staff, with chain-stretching double pulley at upper end, substantially as specified.

IRVEN COPPOCK.

Witnesses:

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HUGH NORTHMAN.