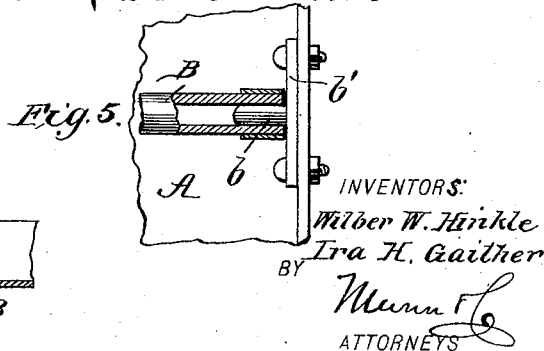
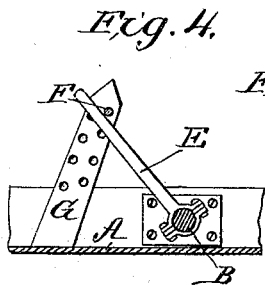
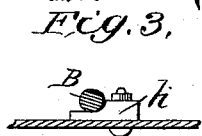
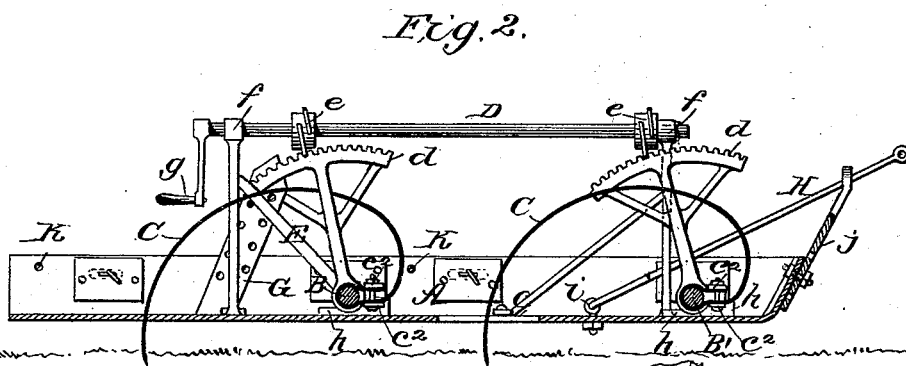
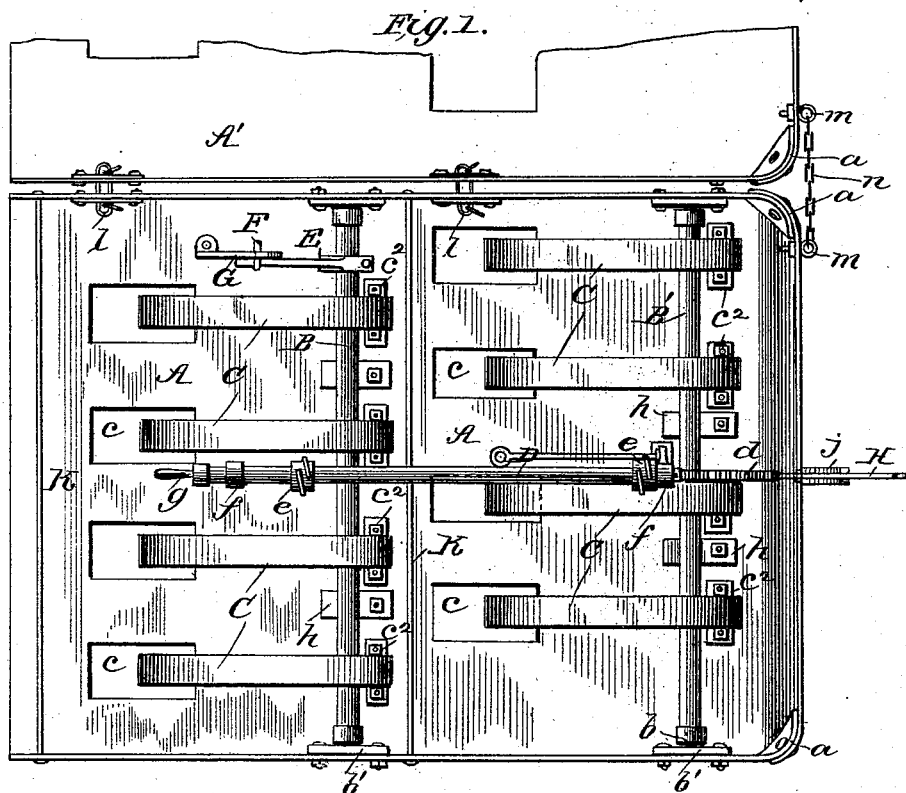


(No Model.)

W. W. HINKLE & I. H. GAITHER.
HARROW.

No. 492,680.

Patented Feb. 28, 1893.



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UNITED STATES PATENT OFFICE.

WILBER WASHINGTON HINKLE, OF HOOD'S MILLS, AND IRA HERMAN
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HARROW.

SPECIFICATION forming part of Letters Patent No. 492,680, dated February 28, 1893.

Application filed October 12, 1892. Serial No. 448,715. (No model.)

To all whom it may concern:

Be it known that we, WILBER WASHINGTON HINKLE, of Hood's Mills, in the county of Carroll, and IRA HERMAN GAITHER, of Cockeysville, in the county of Baltimore, State of Maryland, have invented a new and useful Improvement in Harrows, of which the following is a specification.

The object of our invention is to provide a harrow for cultivating the soil which shall be capable of accurate and easy adjustment, and a variety of adjustments; whose teeth shall be self cleaning by such adjustment, and which harrow shall effectively serve the purposes of both a cultivator and clod crusher.

It consists in the peculiar construction and arrangement of parts which we will now proceed to describe with reference to the drawings in which

Figure 1 is a plan view. Fig. 2 a vertical longitudinal section and Figs. 3, 4, 5 details of the various parts.

The harrow may be made in sections, of which only one complete section is shown at A, while at A' is shown a portion of another section having flexible connections with section A which will be described farther along. The main frame of each section is in the nature of a flat stout metal sheet or plate having its front and side edges turned up so as to drag over the surface of the ground without allowing the dirt or clods to get upon the top of the sheet. The turned up edges of the sheet are at the corners *a* lapped over each other and firmly riveted together as shown.

Cross-wise on the metal sheet are arranged upon the upper side of the same two parallel rock shafts B and B' which are made of piping with ferrules shrunk upon the ends and are similarly equipped. These shafts are journaled upon the sheets by means of gudgeons *b* formed on plates *b'* that are riveted or bolted to the upturned side edges of the sheet. These gudgeons enter the hollow ends of the shafts and form bearings upon which the shafts rock, which bearings are so housed as to be inaccessible to the dirt and are therefore protected from excessive wear. To these rock shafts are rigidly but detachably fastened the spirally curved teeth C that pass down-

wardly through slots *c* in the metal sheet and protrude below a greater or less distance according to the adjustment of the rock shaft. These teeth pass around the shafts where they connect with the same, and are clamped to the shafts rigidly by yoke shaped clips *c'*.

To adjust the rock shafts and determine the protrusion of the teeth below the metal frame, each rock shaft is provided with a rigid arm carrying at its upper end a toothed segment *d* arranged in a vertical plane in the line of draft. With each of these segments there engages a worm *e* on a longitudinal shaft D journaled in standards *f f* at right angles to the rock shafts and provided at its rear end with a crank handle *g*. This shaft D provides the means of adjusting the rock shafts which bear the teeth, for by turning said shaft D by its crank, the worms working in the toothed segments rotate the arms of the rock shafts, and, by turning the latter, cause the teeth to move upwardly or downwardly through the slots in the metal sheet to any extent of protrusion below, or lift the teeth entirely above the sheet and thus clean them of any adhering rubbish, which is discharged from the teeth as they rise through the slots. When the teeth are entirely above the metal sheet, the latter forms a smooth drag for mashing clods or leveling or smoothing the ground.

When the teeth are adjusted to any desired position by the means just described they will be locked and held in this position by the adjusting devices, because the threads of the worm cross the teeth of the segment nearly at right angles; but to provide a more definite stop and gage, we clamp upon the rock shafts, or one of them, a rigid arm E, and this arm is arranged to strike a removable pin F which is adapted to be seated in any one of a series of holes in an inclined standard G rising from the metal frame. By this means the arm E may be stopped at any point to fix the adjustment of the teeth to any number of inches of protrusion below the metal sheet that may be desired.

To prevent the springing or vibration of the rock shafts from the pull of the teeth in the earth, said rock shafts have at suitable

distances along their length supplemental bearings *h* which are bolted to the main plate.

H is the draft bar. This is anchored to an eye-bolt *i* fastened in the main plate and passes through an adjustable standard *j* which is provided with a series of holes and is bolted to the upturned front edge of the main plate. By adjusting the standard higher or lower the elevation of the draft bar may be changed to suit the team.

To connect the sections A A' of a compound harrow, the upturned side edges are slotted and reinforced at the slots by plates riveted thereto, and through the coinciding slots of the two sections a link *l* is passed, and in the ends of the link inside the flanges are placed split rings or keys to prevent the links from pulling out. At the front end eye bolts *m* and a short section of chain *n* are used. This makes a strong and still flexible connection for the sections that may be readily detached when desired.

K are transverse stay rods for the side flanges.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A harrow consisting of a metal sheet or

plate having slots in the same, and a series of curved teeth protruding through the slots, and rock shafts attached to said teeth and adapted to raise and lower the same through the slots and bearings *h*, arranged between the teeth to steady the shafts, substantially as shown and described.

2. The combination with the main frame plate, of rock shafts bearing curved teeth and having arms with toothed segments, and a shaft arranged at right angles to the rock shafts and provided with worm gears meshing with said toothed segments substantially as shown and described.

3. The combination in a harrow, of the frame plate; the rock shafts bearing teeth, and having hollow ends; and a gudgeon bearing fixed to the frame plate and entering the hollow ends of the rock shafts, substantially as and for the purpose described.

WILBER WASHINGTON HINKLE.

IRA HERMAN GAITHER.

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T. H. HUNT, Jr.

Witnesses as to Ira Herman Gaither:

HARRY M. GAITHER,

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