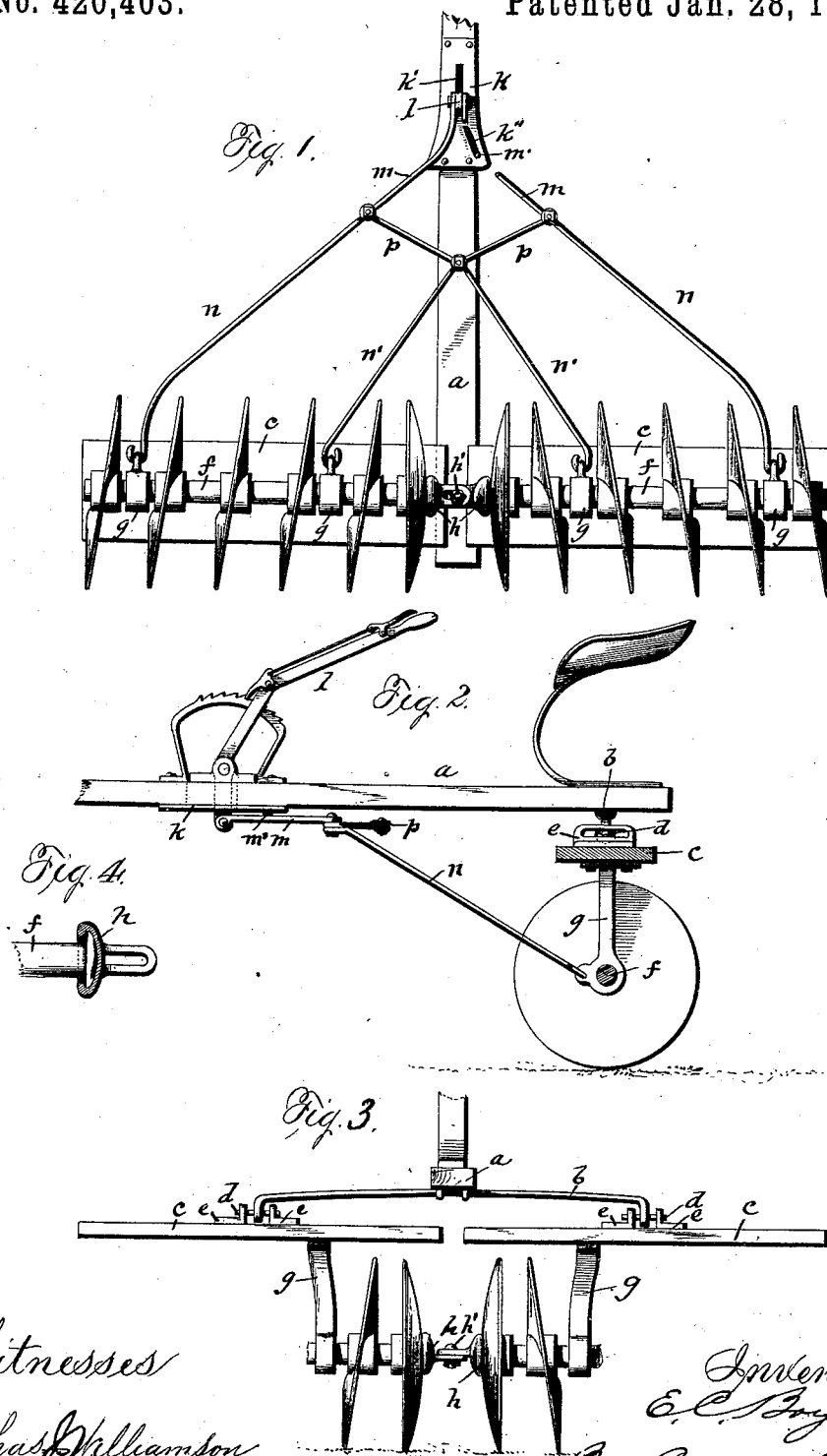


(No Model.)

E. C. BOYER.  
DISK HARROW.

No. 420,403.

Patented Jan. 28, 1890.



Witnesses  
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# UNITED STATES PATENT OFFICE.

EDWARD C. BOYER, OF DAYTON, OHIO.

## DISK HARROW.

SPECIFICATION forming part of Letters Patent No. 420,403, dated January 28, 1890.

Application filed September 24, 1889. Serial No. 324,926. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD C. BOYER, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Disk Harrows, of which the following is a specification, reference being had therein to the accompanying drawings, in which—

10 Figure 1 represents a bottom view of my improved harrow complete; Fig. 2, a side elevation of the same; Fig. 3, a rear elevation; Fig. 4, a detail sectional view of the connection between the gang-axes.

15 The invention relates to that class of rotary harrows known as "disk" harrows, in which are employed two gangs of disks loosely or pivotally connected to the tongue and adapted to be shifted to and held at various angles 20 with respect to the tongue, in order that the soil will be thoroughly pulverized.

This invention has for its object, first, to so improve the mechanism employed for shifting the gangs of disks that the shifting operation may be readily performed while the harrow is working, the inner ends of the gangs being thrown forward and the outer ends rearward, and vice versa, as will presently more fully appear.

30 It has for its object, secondly, to provide an improved connection between the adjacent ends of the gang-axes, whereby the end-thrust of the axes will be taken up with a minimum of friction and their "riding up" or the rising of their inner ends prevented, as will more fully hereinafter appear.

In the drawings, *a* designates an ordinary tongue or pole having rigidly secured to its rear end a transverse beam or arch *b* of suitable length. The ends of this arch are loosely connected to the center of the respective gang-beams *c* by means of a horizontal pin *d* and horizontally-slotted lugs *e*, secured to the gang-beams a suitable distance apart to receive the ends of the arch. These connections permit the gangs a restricted horizontal movement with respect to the arch, this movement being essential in order to permit the proper operation of the shifting mechanism. 50 It is evident that the pins in these connections may be secured to the lugs and the slots formed

in the ends of the arch, if it is so desired, without departing from the invention.

The gang-axes *f* are provided with a suitable number of spiral or plain cutting disks, 55 and are journaled in bearings in the standards *g*, secured to the under sides of the gang-beams. The inner ends of the gang-axes are headed, and over these heads are loosely clamped the outer ends of slotted plates *h*, 60 thus enabling the axes to revolve independently of the connecting-plates *h*. These slotted plates are connected together by a removable pin *h'*, which connects the two gangs loosely together and receives the end-thrust 65 of their axes. These slotted connecting-plates, while allowing limited endwise and lateral movements of the gangs, will effectually prevent their inner ends rising independently of each other. 70

Bolted upon the under side of the tongue at a suitable point is a stationary plate *k*, provided with one longitudinal slot *k'* and two diverging slots *k''* in the rear of the said longitudinal slot. 75

Pivoted in a slot in the tongue and having its lower end extending through the slot *k'* in the plate *k* is the shifting-lever *l*, which is preferably bent backward to be within easy reach of the drum, this lever being held in its 80 adjusted positions by means of a suitable segment and pawl, as is usual in this class of devices.

Pivotally connected to the lower end of the shifting-lever are two rearwardly-extending 85 rods *m*, which are provided with pins *m'*, which work in the diverging slots *k''* of the plate. By means of shifting-rods *n* these rods *m* are pivotally connected to the outer gang-standards, and by means of links *p* and the inner 90 shifting-rods *n'* to the inner gang-standards, all the rods and links being pivotally connected together. By this arrangement of shifting-rods it will be observed that with one movement of the shifting-lever the inner ends 95 of the gangs will be simultaneously moved in an opposite direction to that taken by the outer ends—that is to say, when the inner ends are moved forward the outer ends will be thrown backward, and vice versa. 100

It will be observed that the inner ends of the links *p* and the forward ends of the inner

shifting-rods  $n'$  are all connected together, the pivotal point of their connection being to the rear of the point of connection of the said links to the rods  $m$ , as shown in Fig. 1. By  
5 this construction and arrangement it will be seen that when the bars  $m$  are moved rearwardly the outer ends of the gangs will be moved in the same direction through the medium of the outer shifting-rods  $n$ , while the  
10 inner ends of the gangs will be simultaneously drawn forward by the links  $p$  and the inner shifting-rods  $n'$ , the positive spreading action of the rods  $m$  (caused by pins  $m'$  working in slots  $k''$ ) causing the automatic forward move-  
15 ment of the inner bars  $n'$  and the inner ends of links  $p$ , as is evident.

Having thus fully described my invention, what I claim is—

1. The combination of a tongue, an arch  
20 connected thereto and provided with horizontal pins in its ends, gang-beams provided with slotted plates  $e$ , adapted to embrace the ends of the arch, the pins in the latter working in the slots in the said slotted plates, and means  
25 for shifting the gang-beams, substantially as described.

2. The combination of the slotted plate  $k$ , the rods  $m$ , pivoted to the shifting-lever and provided with pins  $m'$ , working in the diverging slots in plate  $k$ , the links  $p$ , con- 30 nected together and to the rear ends of the bars  $m$ , and the shifting-bars and the gangs, arranged as described and shown.

3. The combination, with the pole, gangs, and shifting-lever pivoted to the pole, of the 35 stationary plate provided with two rearwardly-diverging slots, the rearwardly-diverging rods  $m$ , pivoted to the shifting-lever and provided with pins working in the said diverging slots in the stationary plate, and rods con- 40 necting the rear ends of the rods  $m$  to the respective gangs, whereby the ends of the gangs will be simultaneously moved in opposite directions, substantially as described.

In testimony whereof I affix my signature in 45 presence of two witnesses.

EDWARD C. BOYER.

Witnesses:

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