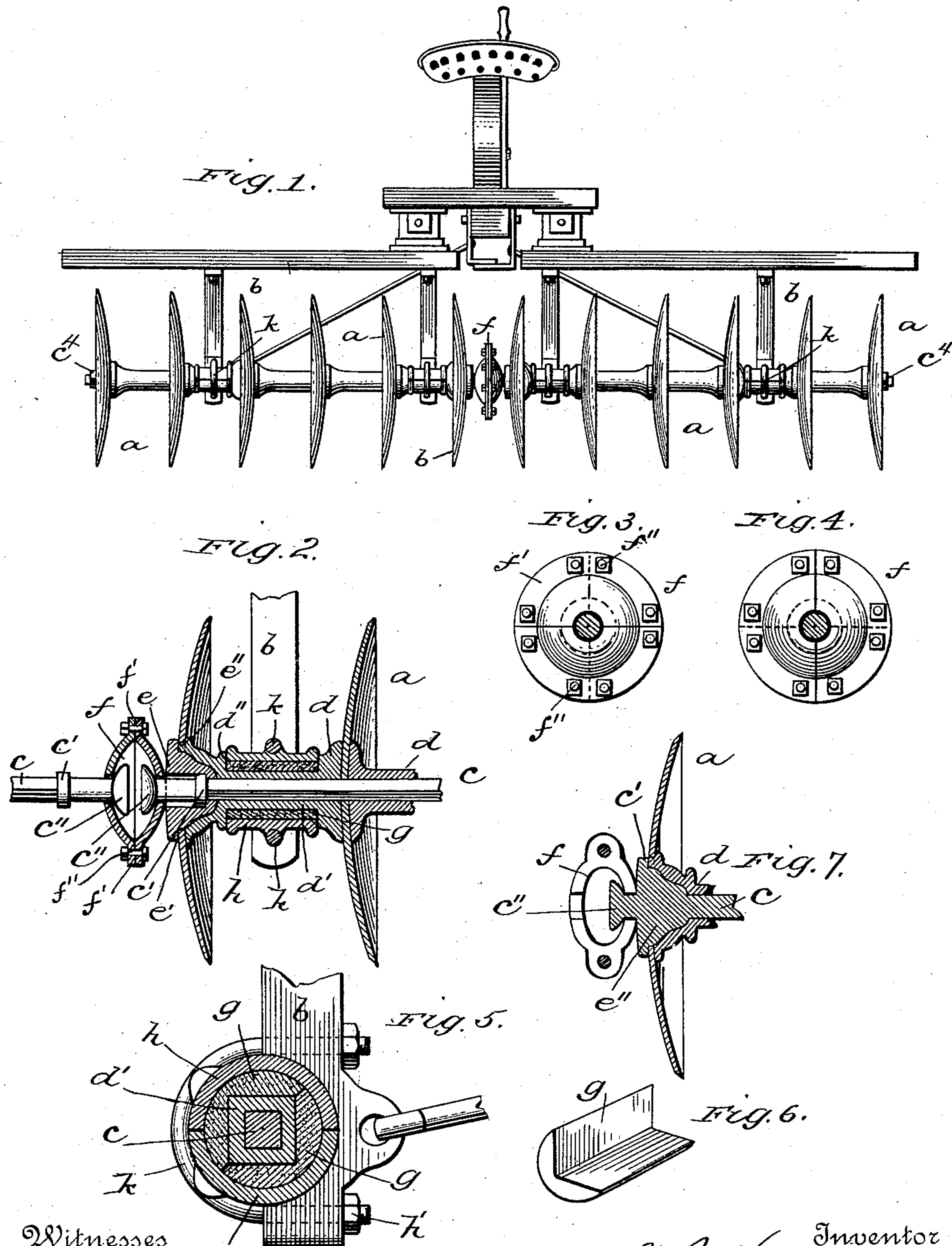


(No Model.)

R. P. HOWARD.  
DISK HARROW.

No. 472,656.

Patented Apr. 12, 1892.



Witnesses  
W. R. Davis  
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# UNITED STATES PATENT OFFICE.

RUFUS P. HOWARD, OF LA CROSSE, WISCONSIN.

## DISK HARROW.

SPECIFICATION forming part of Letters Patent No. 472,656, dated April 12, 1892.

Application filed August 20, 1891. Serial No. 403,214. (No model.)

*To all whom it may concern:*

Be it known that I, RUFUS P. HOWARD, a citizen of the United States, residing at La Crosse, in the county of La Crosse and State of Wisconsin, 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.

This invention has relation to that class of harrows known as "disk harrows," wherein are employed two rotary gangs of disks and means for shifting the gangs with respect to the line of draft, one gang being arranged on either side of the line of draft, and means being employed to take up the end-thrust of the gangs and prevent them separating too far; and it consists in certain novel features of construction and arrangement of parts that will fully hereinafter appear, and be particularly pointed out in the claims appended.

In the drawings, Figure 1 is a rear elevation of an ordinary disk harrow provided with my improvements; Fig. 2, a vertical longitudinal sectional view through the inner end of one of the gangs and its inner bearing; Figs. 3 and 4, detail views of the device interposed between the gangs to take up the end-thrust; Fig. 5, a transverse section showing one of the journal-bearings of the gangs; Fig. 6, a detail view of one section of the separable bushing; and Fig. 7 a detail view of a slight modification.

Referring to the drawings by letters, *a* designates the concave disks, and *b* the hangers depending from the gang-beams and adapted to support the gangs. The disks of each gang are provided with square central openings and adjusted at suitable intervals on a long rectangular bolt *c*, provided with a head *c'* on its inner end and a clamping-nut *c''* on its outer threaded end, sleeves or spools *d* being strung on the bolt between the disks. One end of each of the sleeves *d* is convexed and the other end concaved to fit snugly against and firmly clamp the interposed disks, and the disks are all provided with rectangular passages to fit the rod and revolve with the same. The sleeves are all constructed substantially alike, excepting the ones journaled on the hangers, which are each abruptly reduced in diameter and made rectangular in shape for

a portion of its length, as at *d'*, forming abrupt annular shoulders *d''*, as shown most clearly in Figs. 2 and 5. A cylindrical journal-bushing *g*, composed of two longitudinally-divided sections, is fitted over the reduced part *d'* and is of sufficient length to abut against the shoulders *d''*, this bushing being made rectangular on its interior to snugly fit and revolve with the rectangular sleeve. Embracing this cylindrical bushing is a box *h*, composed of semi-cylindrical sections, whose ends fit within and abut against the shoulders *d''*, an ordinary U-shaped bolt *k* being employed to hold the parts of the box and bushing in place and secure the whole to the hanger *b*.

In operation it will be observed the sectional bushing *g* revolves with the sleeve and within the box *h*, so that the only parts that will become worn are the interior of the box and the exterior of the bushing. The advantages derived from this construction of bearing are important. The main advantage is that the bushing-sections and inclosing box may be readily removed for renewal when worn without loosening or removing any of the disks or sleeves, it being simply necessary to loosen the U-shaped clamping-bolt. It will also be observed that the sleeve will be subjected to no wear whatever, and its shoulders *d''* will serve to assist in holding the bushing-sections and box together and prevent endwise movement of the gangs in their bearings. The heads *c'* on the inner ends of the long bolts *c* are set in axial recesses formed in the end caps *e*, one of which is fitted within the end of each gang. These caps are passed through central circular openings in the end disks and fitted within rounded sockets or depressions in the inner ends of the end sleeves, and they are each provided with an annular flange *e'*, fitting against the convexed surfaces of the disks, whereby when the bolts *c* are tightened these end caps will serve to securely clamp the end disks against the ends of the inner sleeves. To prevent the inner disks rotating independently of the sleeves, teats or lugs *e''* may be formed on the inner ends of the latter and adapted to rest in notches or recesses in the disks, as shown in Fig. 2. The extreme inner ends of the axial bolts *c* terminate slightly beyond the ends of the caps *e* and are each provided with a rounded knob *c''*.



Supported upon the inwardly-projecting ends of the bolts, so as to be free to revolve with them, is a sectional metal casing *f*, which is bolted over the headed ends of the bolts and  
5 loosely couples them together. The steel casing or coupling is composed of two concave disks provided with radial flanges *f'*, perforated for the passage of the short connecting-bolts *f''*, central openings being provided in  
10 the disks for the passage of the respective gang-bolts. When bolted together, the disks inclose the knobs *c''* and their outer convex surfaces bear upon the rounded surfaces of the caps *e* in the ends of the gangs. The  
15 gangs will thus be prevented from coming in contact with each other and also be prevented from spreading, while at the same time the gangs are free to be shifted and rotated. The coupling, being permitted to move back and  
20 forth and revolve with the gangs, will create no appreciable friction.

The coupling-disks may be constructed as shown in Figs. 3 and 4—that is, each disk may be made of two sections and bolted to-  
25 gether at right angles to each other. In this way the disks may be attached to and removed from the headed bolts without disturbing the gangs, and by arranging the sections of one disk at right angles to those of the  
30 other I “break” the joints between the sections and make the coupling as rigid and as strong as though the disks were of one piece.

As shown in Fig. 7, I may make the caps *e* integral with the ends of the bolts *c*, if desired,  
35 and the coupling may be constructed, as shown in this figure, of a pair of dished plates bolted together at right angles to those shown in Figs. 1 and 2.

Having thus fully described my invention,

what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a disk harrow, the combination, with the pair of gangs provided with inwardly-projecting headed bolts, of a revolving coupling-casing inclosing said headed bolts and constructed of two dished disks bolted together,  
45 each of said disks being constructed of two sections and secured together so that the sections of one disk will break the joint between sections of the other disk, as and for the purpose set forth. 50

2. The combination of the two gangs, each consisting of a long rectangular bolt *c*, provided with a head *c'* at its inner end and a tightening-nut on its outer end, disks and interposed sleeves on said bolts, a flanged cap *e*,  
55 carried on the inner end of the bolts and setting in recesses in the end sleeves, these caps being provided with axial recesses for the heads *c'* of the bolts, knobs *c''* on the extreme inner ends of the bolts *c*, and a sectional coupling inclosing said knobs *c''*, substantially as described. 60

3. The combination of a support, a sectional box *h*, clamped thereto, a rectangular bolt passing through the box and provided with sleeves  
65 *d* and disks, the sleeve inclosed in said box being reduced in diameter and formed rectangular, as at *d'*, and a sectional bushing inclosing said reduced portion *d'* and adapted to revolve within the sectional box, substantially as described. 70

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

RUFUS P. HOWARD.

Witnesses:

WILLIAM H. DAVIS,  
LOUIS P. SCHNEIDER.