W. T. WERTMAN.

Harrow.

No. 198,716. Patented Dec. 25, 1877.

Fig 1

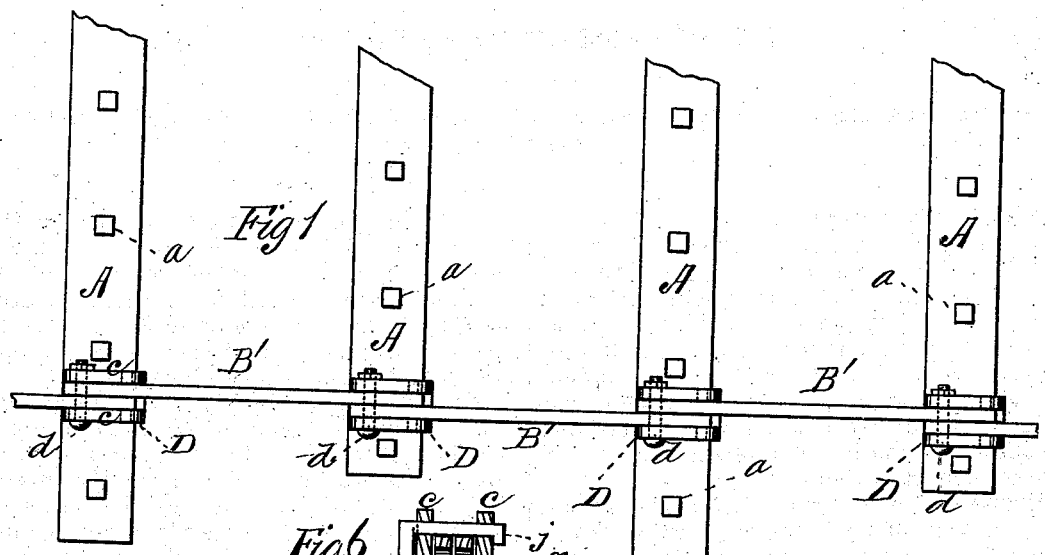

Fig 6

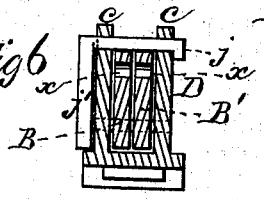

Fig 2

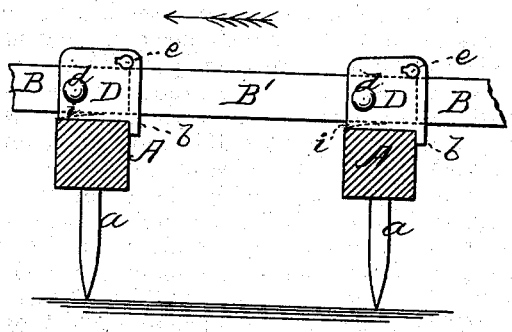

Fig 3

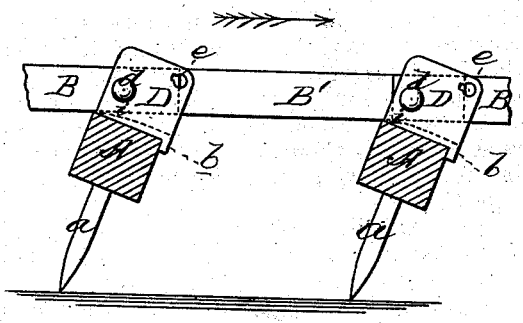

Fig 4

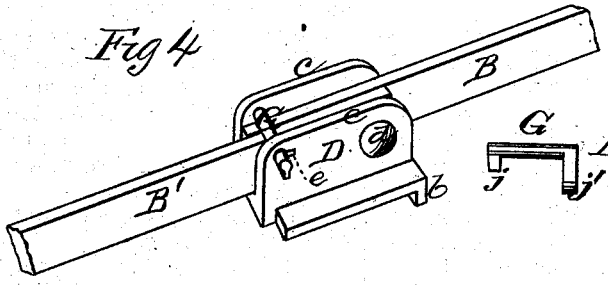

Fig 5

WITNESSES

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UNITED STATES PATENT OFFICE.

WILLIAM T. WERTMAN, OF WINONA, MINNESOTA.

IMPROVEMENT IN HARROWS.

Specification forming part of Letters Patent No. **198,716,** dated December 25, 1877; application filed November 3, 1877.

To all whom it may concern:

Be it known that I, WILLIAM T. WERTMAN, of the city of Winona, in the county of Winona and State of Minnesota, have invented a new and valuable Improvement in Harrows; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a top view of my improved harrow. Figs. 2 and 3 are sectional views, showing the harrow-teeth in different positions. Fig. 4 is a perspective view of the joint-plate and bars. Fig. 5 is a detail view of the key, and Fig. 6 is a cross-section of the plate and bars.

This invention has relation to improvements in flexible drags or harrows.

The nature of my invention consists in a harrow the heads of which are connected together by flexible joints of such a nature that when the said harrow is driven in one direction the teeth will be vertical, but when reversed inclined, thereby adapting one machine for harrowing and also for smoothing purposes.

It also consists in combining, with a U-shaped joint-plate and the lapped sectional bars pivoted therein at one end, a key extending through the said plate above the said bars, whereby the harrow is made to all intents rigid, as will be hereinafter more fully set forth.

In the annexed drawings, the letter A designates the heads or transverse bars of my improved harrow, carrying the teeth *a*, and connected together by means of the sectional bars B B′. At each end of these heads is placed and rigidly secured a strong metallic U-shaped plate, D, having at one or both of the ends of its flat bottom a flange or lip, *b*, which serves to prevent the said plates from turning upon their bases when secured to their head-bars.

The bars B B′ fit snugly between the arms *c* of the plates D, and extend from opposite sides, from end to end, of the said plates, or nearly so, forming, as shown in Fig. 3, a lap, and they are pivoted thereto by means of a bolt, *d*, extending through registering-perforations in the bars and plate at one end of the latter. In this position the lower edge of the bars B B′ bear upon the bottom of the plates D, and the former is allowed a certain degree of vertical play with reference to the plate by an incline or bevel, *i*, formed in the bottom thereof at the end next the pivot-bolt *d*.

When the harrow is driven over the ground with the beveled ends of plates D in front, the heads A will hold the teeth in a vertical position, as shown in Fig. 2, for the reason that the bar B is jammed by the biting of the said teeth and the force of traction against the bottom of the plate D, without, however, impairing the flexibility of the harrow-section in passing over uneven ground. But if the said harrow be reversed—that is, driven in the opposite direction—the teeth will assume the inclined position shown in Fig. 3, owing to the descent of the bars B into the incline *i* of the said plates, in which position they are locked by shifting the key to perforations *x*.

If it be desired to render the entire section rigid, as is requisite under certain well-known circumstances, I use the following simple and effective device: The sides of the U-plates D are extended considerably above the upper edge of the bars B B′, and are provided at their ends farthest from the pivot-bolt *d* with a horizontal key-slot, *e*, in the same plane with each other, and just above the upper surface of the said bars. Through these slots, above the bars, is passed a key-stay, G, having at one end a short projection, *j*, and at the other a preferably weighted handle-piece, *j′*, both of which are at right angles to the body or stem of the key, and in the same plane with each other. This key is then turned with its handle and projection at right angles to the length of slots *e*, and the harrow is to all intents and purposes rigid.

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

1. In a flexible harrow, the combination of the U-shaped plates D, having incline *i* at one end, with the lapping bars B B′, pivoted to the inclined end of said plates, and the rake-heads A, substantially as set forth.

2. The combination of the U-shaped plates D, having oblong slots *e* at one end, and the

E. T. WESTERFIELD.

Vehicle Spring.

No. 198,717. Patented Dec. 25, 1877.

Fig: 1.

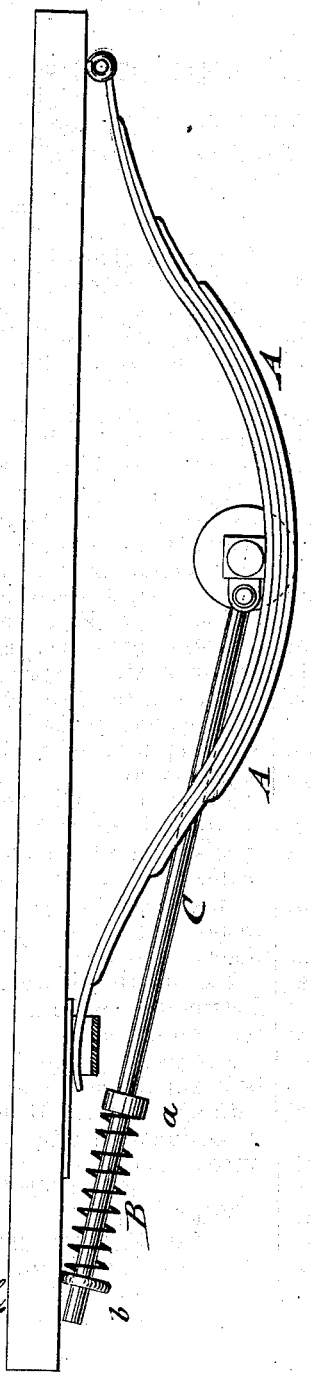
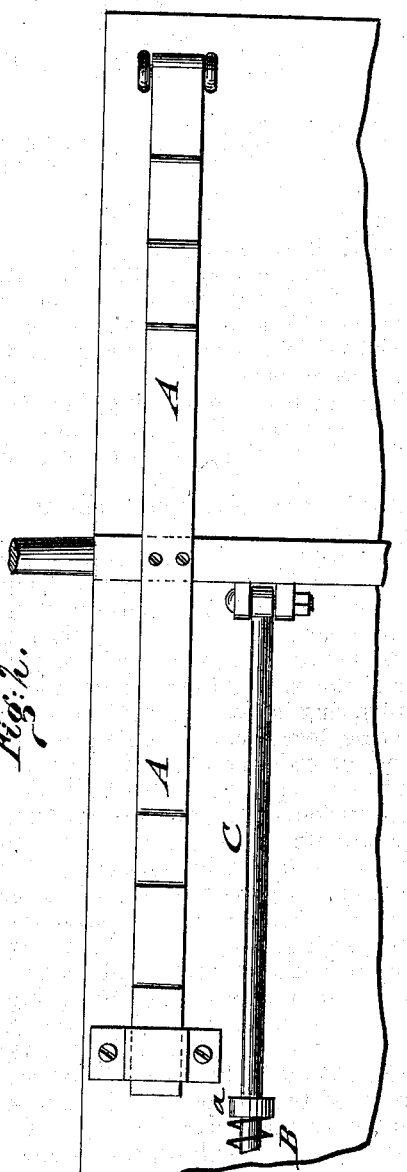


Fig: 2.



WITNESSES:

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