(No Model.)

J. E. WELLER.

SULKY HARROW.

No. 260,339. Patented June 27, 1882.

Fig. 1

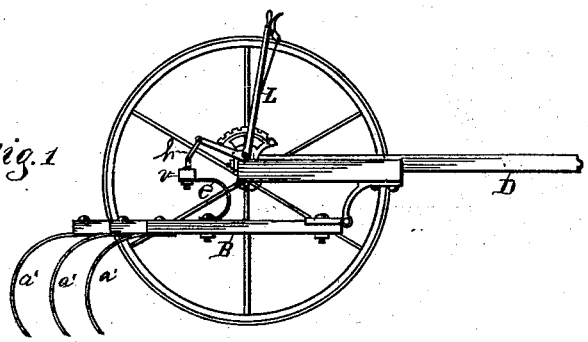
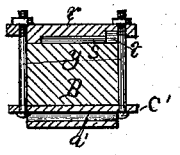


Fig. 2



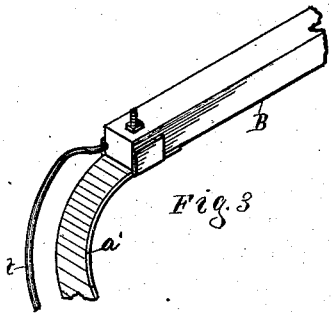


Fig. 3

Fig. 4

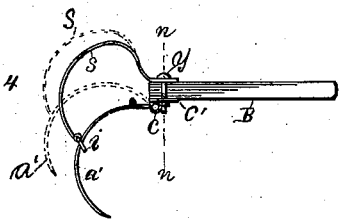
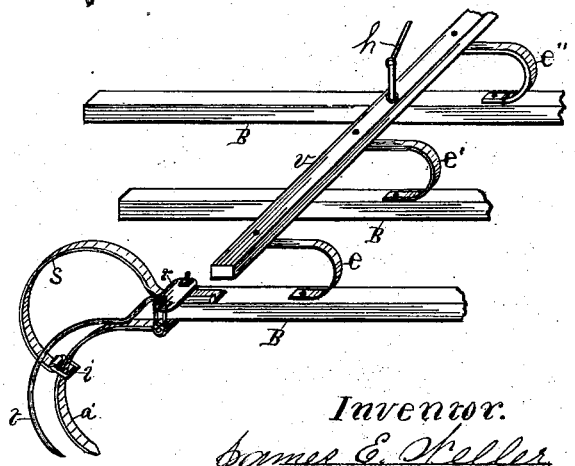


Fig. 5



Witnesses.
John C. Perkins
Eugene S. West

Inventor.
James E. Weller.
By Lucius C. West
Atty.

UNITED STATES PATENT OFFICE.

JAMES E. WELLER, OF KALAMAZOO, MICHIGAN, ASSIGNOR OF ONE-HALF TO SAMUEL E. WALBRIDGE AND WILLIAM R. BEEBE, OF SAME PLACE.

SULKY-HARROW.

SPECIFICATION forming part of Letters Patent No. 260,339, dated June 27, 1882.

Application filed August 18, 1881. (No model.)

To all whom it may concern:

Be it known that I, JAMES E. WELLER, a citizen of the United States, residing at Kalamazoo, county of Kalamazoo, State of Michigan, have invented a new and useful Sulky-Harrow, of which the following is a specification.

This invention relates to sulky-harrows constructed with independently-hinged tooth-bars.

It has for its object certain improvements on a former construction of mine patented to me August 9, 1881, No. 245,423, in which the tooth-bars were associated in clusters of graduated lengths, each bar bearing a spring, with which connection was formed with the lifting-lever by means of a connecting-bar coupled across short diagonal bars secured to the springs on the beams of each cluster, in such a manner that the springs would be located at an equal distance from the end of each tooth-bar, that the effect on each tooth might be the same. In my present construction I dispense with the short diagonal bars and graduate the springs in relation to their elasticity in conformity with the graduated length of the tooth-bars of each cluster.

In considering the construction of my device it will appear obvious to all that the peculiar configuration of the springs and the number of graduated bars in a cluster, and whether the device contains but a single cluster of graduated tooth-bars, have no particular bearing on the novelty of the invention.

A further object is to provide a harrow with auxiliary teeth located laterally and rearwardly from the main teeth, by means of which the ridges thrown up by said main teeth are raked down comparatively level.

In the drawings forming a part of this specification, Figure 1 is a side elevation of an association of commonly-constructed features introduced to show the relations of my improvements with other devices; Fig. 2, a cross-section of Fig. 4; Fig. 3, a rear perspective showing the auxiliary tooth; Fig. 4, a side view of tooth and spring; and Fig. 5 illustrates the graduation of tooth-beams and springs in their relation with each other.

B B are independently-hinged tooth-bars of unequal lengths, on the rear end of which the teeth are designed to be located.

In Fig. 5, e e' e'' represent graduated springs, spring e'' being three times as stiff or non-elastic as spring e. The springs are located on a horizontal line with each other. The difference in the length of each beam from the springs to the rear ends is as the ratio of one to three. A transverse bar is located on the springs and connected with them, which bar is also connected with lifting lever L, Fig. 1, by means of link h, whereby a pressure may be brought to bear on all the shares at once, or the latter may be raised from the soil in the usual manner by operating said lever. In Fig. 1 the relation which the share, share-bar B, spring e, transverse connecting-bar, and lever L bear to each other is clearly shown. By this arrangement a given resistance to the tooth on the short beam has the same effect on spring e that a like resistance to the share or tooth on the longest beam would have on spring e'', on the principle governing the law of levers—the longer the lever the greater the effect produced by a given power. Thus a downward bearing on the transverse connecting-bar by means of the lever L affects each share alike, whereas if the springs were all of the same degree of elasticity the bearing would be the greatest on the share of the shortest bar. With this construction it is sometimes desirable to use a tooth also having a yielding capacity. In Fig. 4, illustrating such a tooth, said tooth a' is hinged to a holder underneath the rear end of the beam B, and secured to a spring, S, on top of said beam, said spring having a link, i, loosely hinged in its lower end, through which the tooth a' passes. The link being wider than the thickness of the tooth, and also being hinged loosely, allows the tooth to play freely and retains it ready to act on spring S when intercepting hard soil.

The operation is illustrated by dotted lines in Fig. 4.

t shows my auxiliary leveling-tooth, usually made of round spring metal, and is shouldered in such a manner as to stand at a location laterally and rearwardly from the tooth where its lower end intercepts the ridge made by the share. This auxiliary tooth is designed to oscillate more freely than the main share and not to cut so deeply. Figs. 2, 3, and 5 show different ways in which it may be secured to the beam. Fig. 2 is a section on line n n in Fig. 4, showing how binding-bar r is shoul-

dered in a manner to hold both the spring S and tooth *t*. The lower plate, *c'*, is provided with bar *c*, on which the tooth *a'* is hinged.

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

1. In a sulky-harrow, the hinged share-bars, of graduated lengths, provided with the graduated springs, and the transverse bar connecting said springs with the lifting-lever, all in combination, substantially as set forth, to effect the purpose specified.

2. The combination, with the harrow-beam, of the curved tooth *a'*, attached to the rear end thereof, and at one side of said rear end, the auxiliary tooth having its shank laterally and rearwardly bent, for the purpose specified, substantially as shown.

JAMES E. WELLER.

Witnesses:
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EUGENE S. WEST.