(No Model.) 2 Sheets—Sheet 1.

# L. C. CHAPIN & B. F. RIX.

## HARROW

No. 301,094. Patented July 1, 1884.

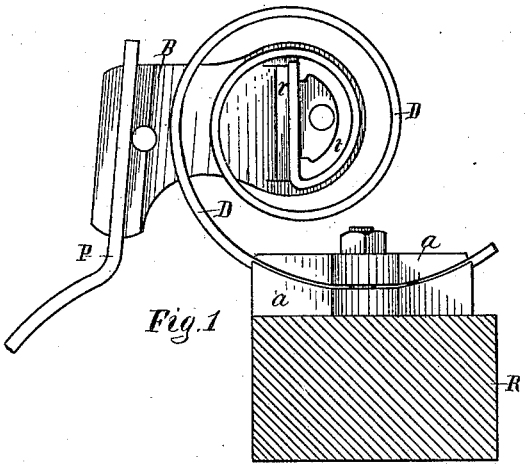


Fig. 1

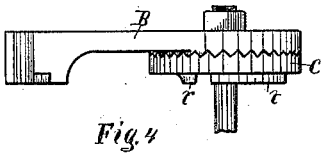


Fig. 4

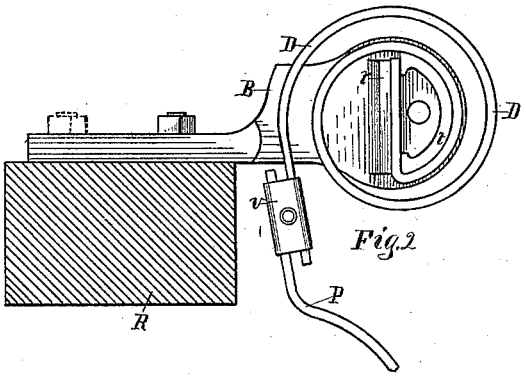


Fig. 2

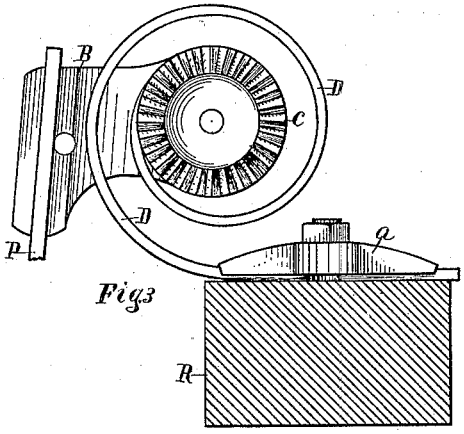


Fig. 3

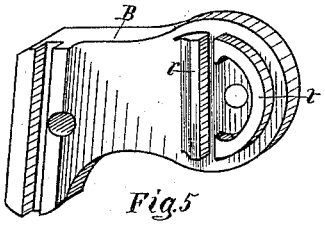


Fig. 5

Witnesses.
John C. Perkins
John H. Chase

Inventors.
Lebeus C. Chapin
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By Lucius C. West
Atty.

(No Model.) 2 Sheets—Sheet 2.

# L. C. CHAPIN & B. F. RIX.

## HARROW.

No. 301,094. Patented July 1, 1884.

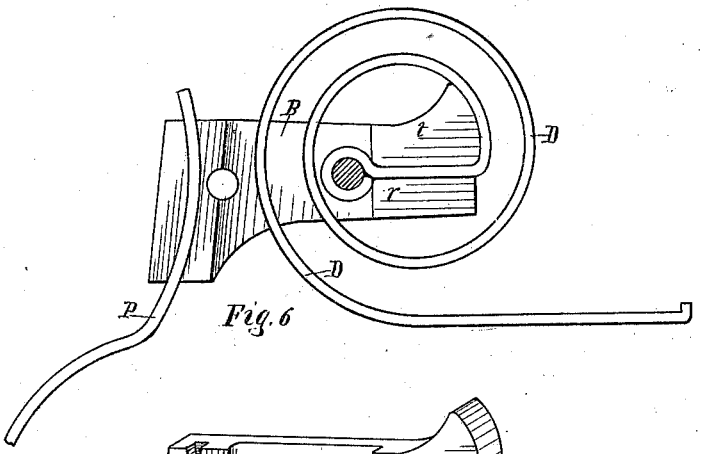


Fig. 6

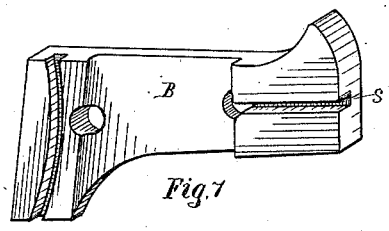


Fig. 7

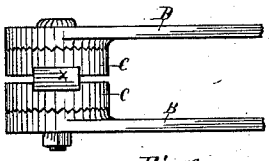


Fig. 8

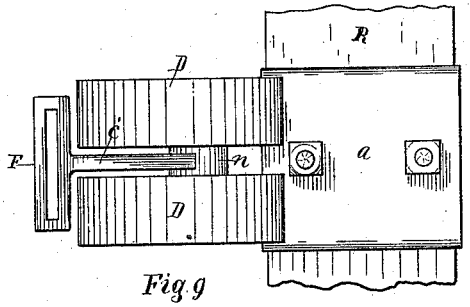


Fig. 9

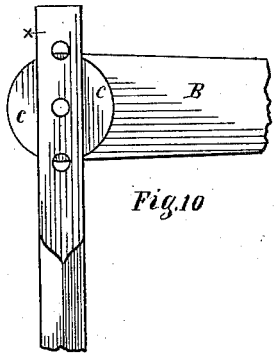


Fig. 10

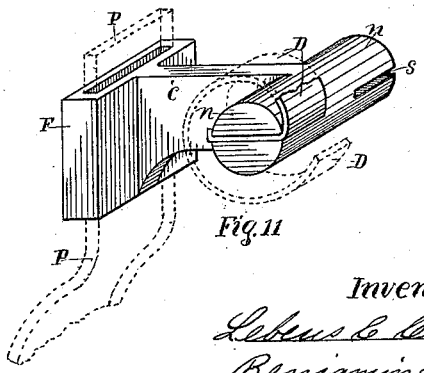


Fig. 11

Witnesses.
John C. Perkins
John A. Chase

Inventors.
Lebeus C. Chapin
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By Lucius C. West
Atty.

# UNITED STATES PATENT OFFICE.

LEBEUS C. CHAPIN AND BENJAMIN F. RIX, OF KALAMAZOO, MICHIGAN.

## HARROW.

SPECIFICATION forming part of Letters Patent No. 301,094, dated July 1, 1884.

Application filed January 11, 1884. (No model.)

*To all whom it may concern:*

Be it known that we, LEBEUS C. CHAPIN and BENJAMIN F. RIX, citizens of the United States, residing at Kalamazoo, county of Kalamazoo, State of Michigan, have invented new and useful Improvements in Harrows, of which the following is a specification.

Our invention relates to that class of harrows and cultivators in which the teeth or shares have an elastic effect imparted to them by means of springs constructed independently of the shares, but connected with them by suitable means.

The invention consists in the improved construction and combination of parts substantially as below described and claimed.

In the drawings forming a part of this specification, Figure 1 is a side elevation with one side of the tooth-holder removed. Fig. 2 shows an equivalent change in combining the parts in Fig. 1. Fig. 3 shows a change from Fig. 1 in the mode of adjusting the pitch of the tooth; Fig. 4, a broken top view of parts in Fig. 3; Fig. 5, one-half of the tooth-holder in perspective; Fig. 6, a side elevation with one-half of the tooth-holder removed, showing changes in the tooth-holder and spring; Fig. 7, a perspective of one-half of the tooth-holder of the kind shown in Fig. 6; Fig. 8, top view of the tooth-holder, showing a change in adjusting the pitch of the share; Fig. 9, a top view showing a construction for using two springs; Fig. 10, a side elevation of part of Fig. 8, and Fig. 11 a broken perspective view of Fig. 9.

The spring D, for actuating the share or tooth P, consists in a strip of spring metal, preferably coiled in substantially the form shown in Fig. 1. Slight changes in the regular coil may be made, as shown in Figs. 2, 3, and 6. The inner or central end of the coil is thrown out of the regular line of the coil, forming a hemispherical loop, Fig. 6, to prevent the spring from drawing out of the holder. The other end of the spring D is adapted for connection with the tooth-beam R, and may be straight, as in Fig. 3, or curved, as in Fig. 1. When the securing end is curved and located in a curved seat, *a'*, the spring may be longitudinally adjusted to control the depth of cut of the tooth P, as in former constructions. A binding plate or clip, *a*, is made to conform to the shape of the seat, and secures the spring therein. Any suitable tooth or share may be used having an upper portion adapted for connecting with the tooth-holder B.

The tooth-holder consists of two parts, like the part shown in Fig. 5—one on each side of the spring D and the tooth P. One end of the holder is provided with raised portions on the inner face of its two parts, *r t*, forming between and around them a seat conforming to the peculiar contour of the inner end of the spring D, and adapted to receive said end, as shown in the different figures of the drawings. The construction shown at the right of Fig. 7 is deemed equivalent to that at the right of Fig. 5. An eye may be formed in the secured end of the spring, as in Fig. 6, and one of the securing-bolts be located through it. In Fig. 2 this bolt passes through the loop formed by the straight end and a portion of the coil of the spring D. The other end of the tooth-holder has a channel in each inner side thereof to receive the edges of the tooth P. This channel may be straight, Figs. 1 and 5, or curved, Figs. 6 and 7, or otherwise conform to the shape of the particular tooth used. Another securing-bolt passes through the holder between the upper portion of the tooth and the bow of the spring-coil.

The end of the tooth-holder B may be made as in Fig. 4, having a ratchet-surface radially formed thereon, and a disk, *c*, located each side of the spring D, and between it and the sides of the holder B. These disks are provided with a like radially-formed ratchet adapted to engage the ratchet-surfaces of the holder, Figs. 3, 4, 8.

In the first two named figures the side of the disk which rests against the edges of the tooth corresponds to that shown in Fig. 5, while in the latter-named figure the recesses are formed square to receive a spike-tooth, X. By means of this ratchet construction, by loosening the securing-bolt at this end the tooth may be changed and set at any desired angle, as in prior devices. If preferred, one end of the holder may be adapted for connection with a tooth-beam, R, Fig. 2, and the tooth P connected with the free end of the spring D by means of a suit-

able clip, V. More than one spring D may be used, if desired, Figs. 9 and 11. This will be found especially desirable with a wide heavy tooth. In Fig. 11 a tooth-holder is shown suitable for this purpose. The bar *n*, having slots S to receive the inner ends of the springs D, is connected with the loop F by bar *c'*. These parts are usually made integral. The previously-described tooth-holder B may be made double in a manner to locate a part, Fig. 5, each side of each spring used, if preferred. The tooth to be used with this construction should be rigid. Owing to the peculiar form of the spring D and its relation to the holder and tooth, the leverage on the parts is such that a very prompt and advantageous action is secured, both as regards the effect of the tooth in the soil and the demands made upon the spring metal used.

Having thus described our invention, what we claim as new, is—

1. The combination, with the spring having the central end thrown out of the line of the coil, and a tooth or share, of a holder forming the connecting means between said share and spring, consisting of the two clamp-plates having their inner faces at one end adapted to clamp the share, and their inner faces at the other end adapted to clamp said central end of the spring, substantially as set forth.

2. The combination, with a tooth or share, and a circularly-coiled spring provided at the end in the center of the coil with a hemispherical loop, of a tooth-holder adapted to clamp and hold the tooth at one end, and to clamp said loop at the other end, substantially as described.

3. The combination, with a share and circularly-coiled spring having the central loop, of a holder consisting of the two clamp-plates having their inner faces at one end adapted to clamp the share, and their inner faces at the other end adapted to clamp said central loop, and the clamping-bolts, all substantially as described and shown.

4. The combination, with a tooth or share and the circularly-coiled spring, of a holder provided on the inner faces of its two parts at one end with tooth-channels, and on the inner faces of the other ends with the raised portions, said parts adapted to clamp said tooth and inner end of the spring, and entirely disconnected from the harrow-beam, substantially as set forth.

In testimony of the foregoing we have hereunto subscribed our names in the presence of two witnesses.

LEBEUS C. CHAPIN.
BENJAMIN F. RIX.

Witnesses:
WM. S. LAWRENCE,
W. MILTON LEE.