(No Model.)

L. A. MANCHESTER.

SPRING HARROW.

No. 343,717. Patented June 15, 1886.

Fig. 1.

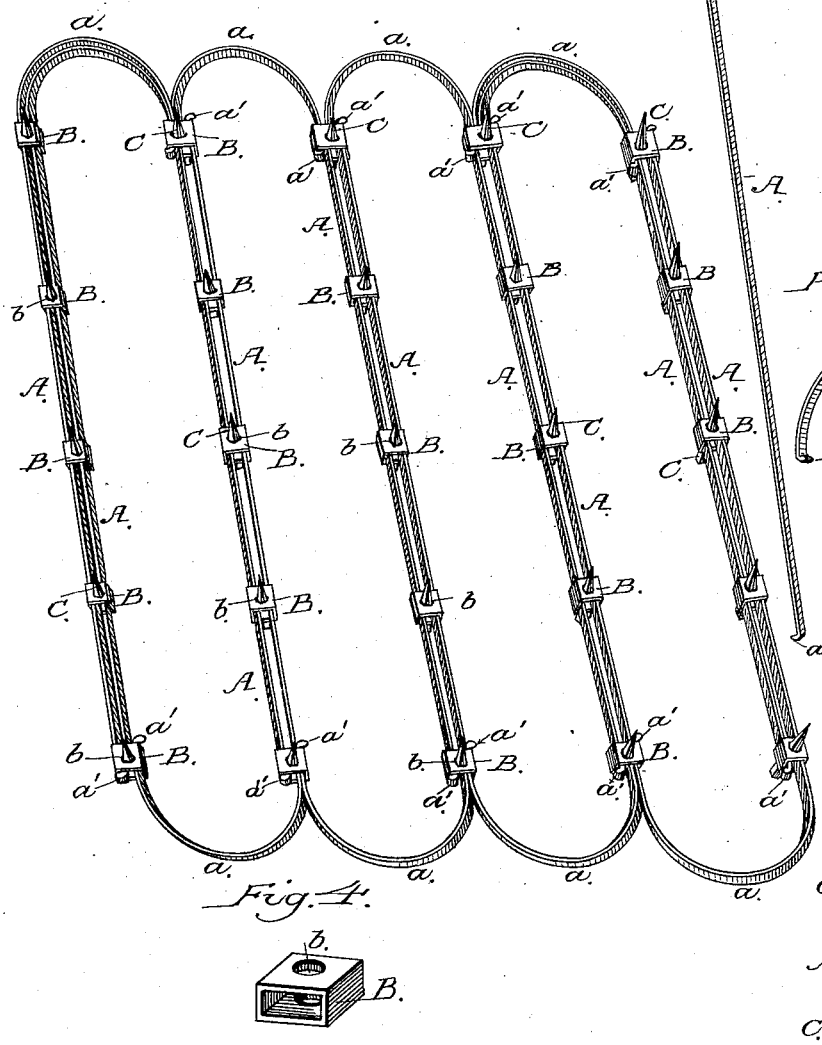

Fig. 2.

Fig. 3.

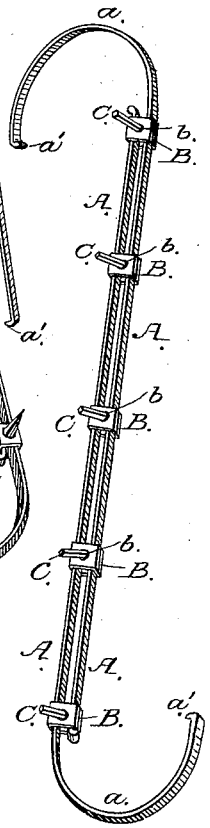

Fig. 4.

Witnesses
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UNITED STATES PATENT OFFICE.

LUMAN A. MANCHESTER, OF MERCED, CALIFORNIA.

SPRING-HARROW.

SPECIFICATION forming part of Letters Patent No. 343,717, dated June 15, 1886.

Application filed February 20, 1886. Serial No. 192,707. (No model.)

To all whom it may concern:

Be it known that I, LUMAN A. MANCHESTER, of Merced, in the county of Merced and State of California, have invented an Improvement in Spring-Harrows; and I hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to the class of harrows; and it consists in the combination of the peculiar curved spring-bars, the securing or uniting bands, and the teeth acting as wedges and tightening all the parts together, all as I shall hereinafter describe.

The object of my invention is to provide a simple, strong, and effective harrow, the frame of which is of a springy character, the whole being secured together without bolts, screws, or rivets, and having no separate cross-bars.

Referring to the accompanying drawings, Figure 1 is a perspective view of my harrow from underneath. Fig. 2 is a view of one of the independent bars A. Fig. 3 is a view showing two bars connected. Fig. 4 is a view of the band B.

The frame consists of the separate independent bars A. These are made of a springy nature, preferably of steel. Each bar has a curved end, *a*, which is, however, not made on a true arc of a circle, so that when the bars are fitted together the frame will have an oblique draft. Both ends of the bars are provided with small calks or hooks *a'*.

B are the sleeves or bands which unite the bars, which latter are so laid up as to lie parallel with each other in pairs traversing the length of the frame. The bands B are preferably of different sizes, which construction is necessary, as certain of said bands are designed to secure the ends of two, three, or more of the bars A, while the remaining bands may only embrace the side portions of two of said bars. The hooked ends of the bars engage the edges of the end bands, whereby they are prevented from drawing out. The bars simply pass through intermediate bands. Through the bands vertically are made round holes *b*, through which the teeth C pass. These teeth are of the usual form, angular in cross-section, and they can therefore be driven tightly into their round seats. The teeth pass between the bars A of each pair and wedge them in the sides of the bands, being thereby themselves wedged as well. This forms the complete harrow or any section of a complete harrow.

The bands, the bars, and the teeth are all wedged together tightly, and there is no need to use a single bolt, screw, or rivet in the whole frame; nor are there any cross-bars, the curved ends of the bars A acting as such.

When several sections are coupled together, I use rings instead of hinges.

The construction is simple, and the harrow can be made at small cost, and is durable and effective.

I am aware it is not broadly new to construct a harrow with spring or yielding frames and rigid teeth, nor is it new to embody in the construction of a harrow a spring or yielding frame and spring-teeth; therefore I do not broadly claim such construction as my invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a harrow, the frame consisting of the bars A, having each a curved end by which they are united, substantially as described.

2. In a harrow, the frame consisting of the independent bars A, having a springy nature, each bar having a curved end, *a*, by which they are united, substantially as described.

3. In a harrow, the independent bars A, having each a curved end, *a*, in combination with the bands B, by which said ends are connected, substantially as described.

4. In a harrow, the independent bars A, having each a curved end, *a*, and a calk or hook, *a'*, on each end, in combination with the bands B, with which the calks or hooks engage, and by which the bars are connected, substantially as described.

5. In a harrow, the combination of the independent bars A, having each a curved end, *a*, and arranged to form parallel pairs, the bands B, through which the bars pass, and the teeth C, passing through said bands and between the bars of each pair, whereby the whole is wedged together, substantially as described.

6. A harrow consisting of the independent bars A, having each a curved end, *a*, and a calk or hook, *a'*, on both ends, said bars being ar-

ranged in parallel pairs, the bands B, through which the bars pass, and with the end ones of which the calks or hooks engage, and the teeth C, passing through the bands and between the bars of each pair, whereby the whole is wedged together, substantially as described.

7. A harrow consisting of the independent bars A, having each a curved end, *a*, and a calk or hook, *a'*, on both ends, said bars being of springy material, and so laid up as to form with their straight portions parallel pairs and with their curved portions the end connections thereof, the bands B, through which the bars pass, and with the end ones of which the calks or hooks engage, and the teeth C, passing through the bands and between the bars of each pair, whereby the whole is wedged together, substantially as described.

In witness whereof I have hereunto set my hand.

LUMAN A. MANCHESTER.

Witnesses:
A. C. SWAIN,
A. BADT.