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R. FULLER.

STUMP FOR HOLDING HOP TRAINING STRINGS.

No. 553,235. Patented Jan. 21, 1896.

Fig. 1.

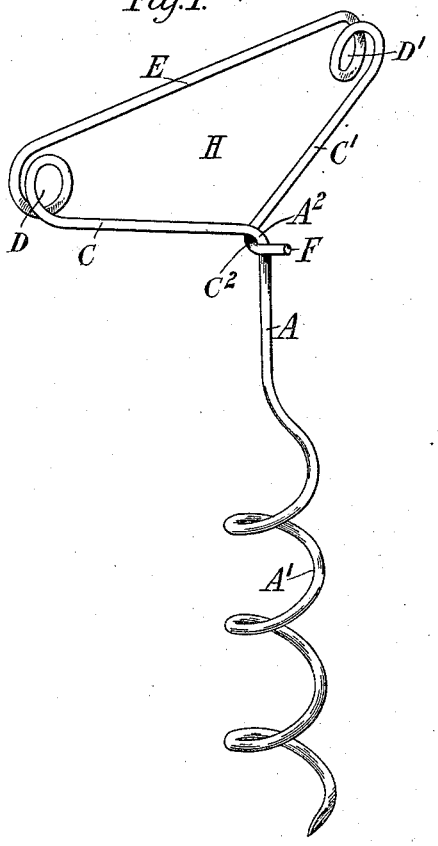


Fig. 2.

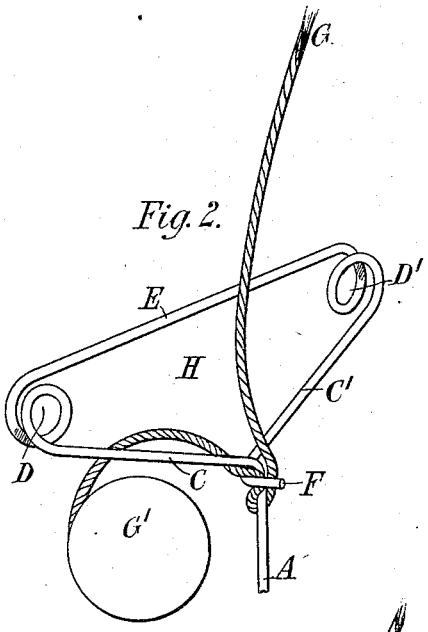


Fig. 3.

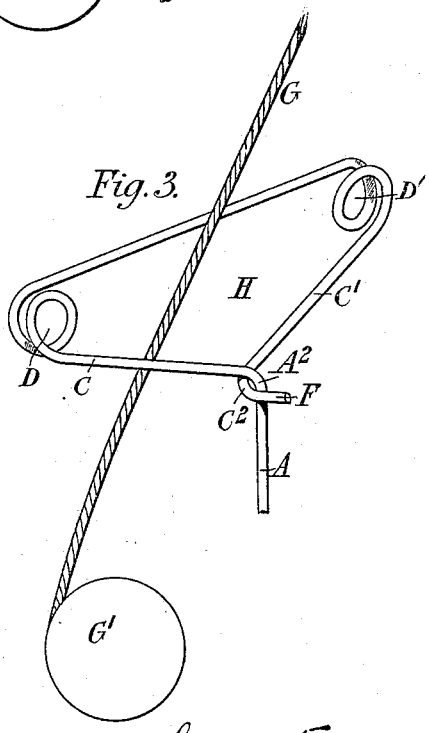
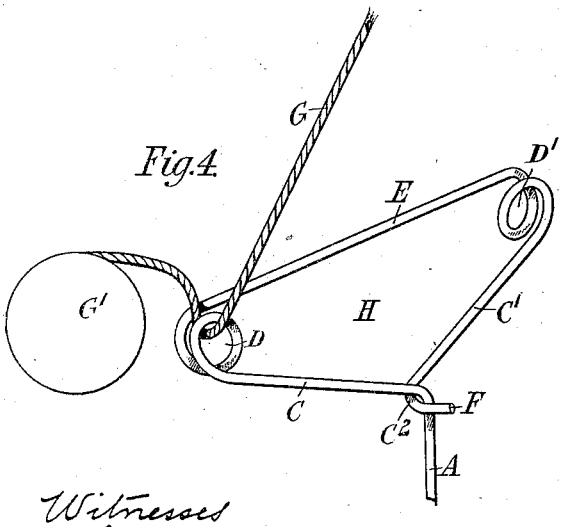


Fig. 4.



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STUMP FOR HOLDING HOP TRAINING STRINGS.

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Fig. 5.

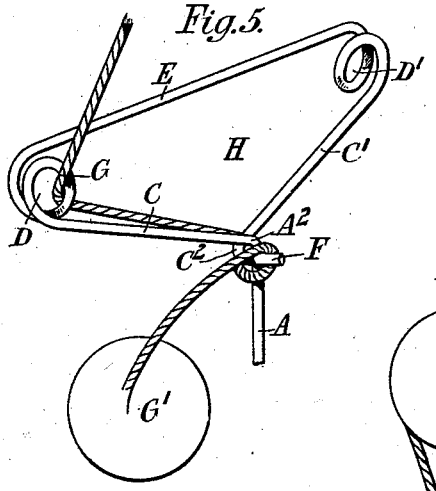


Fig. 6.

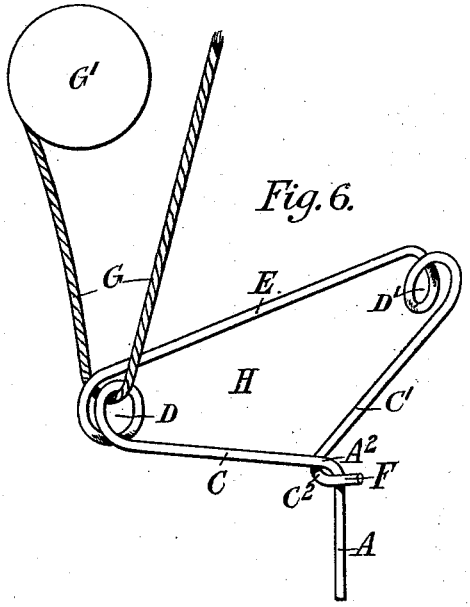
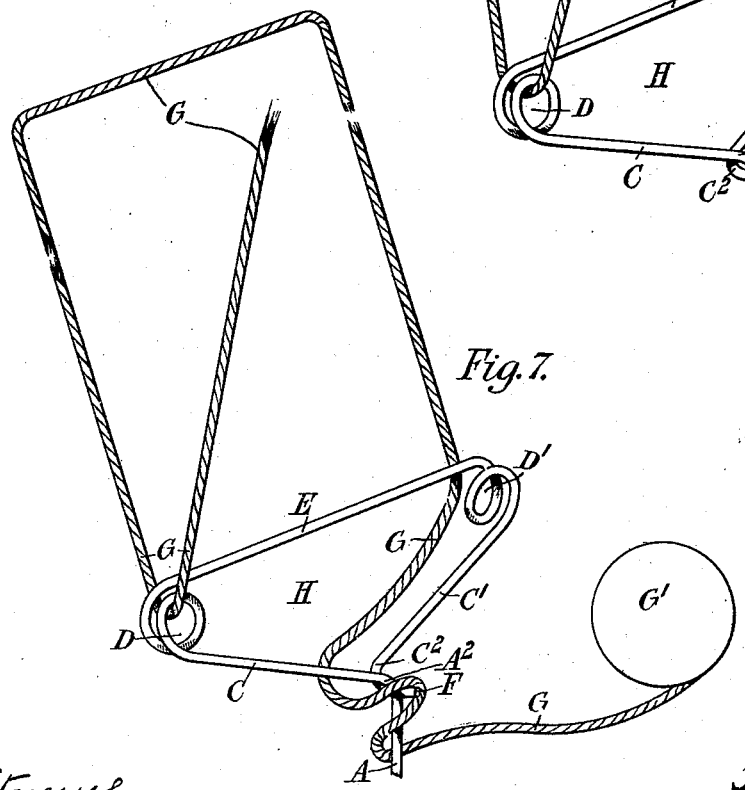


Fig. 7.



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(No Model.) 4 Sheets—Sheet 3.

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STUMP FOR HOLDING HOP TRAINING STRINGS.

No. 553,235. Patented Jan. 21, 1896.

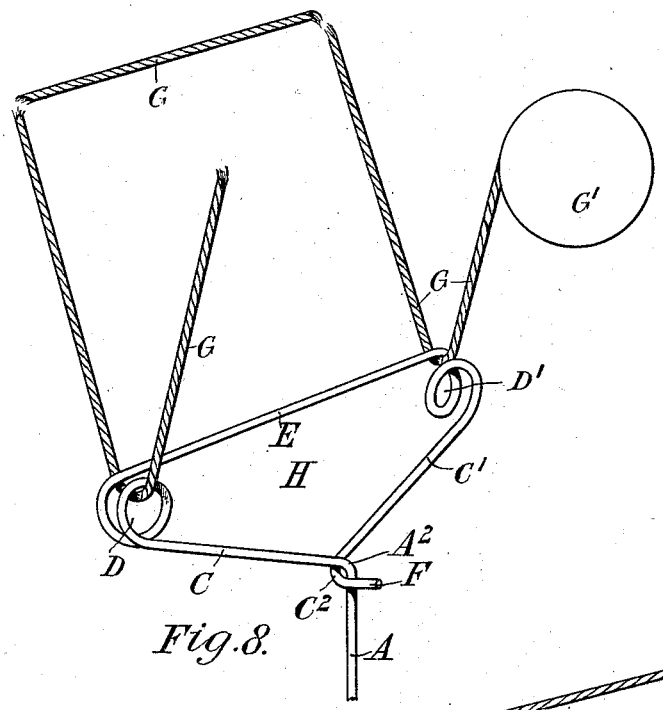

Fig. 8.

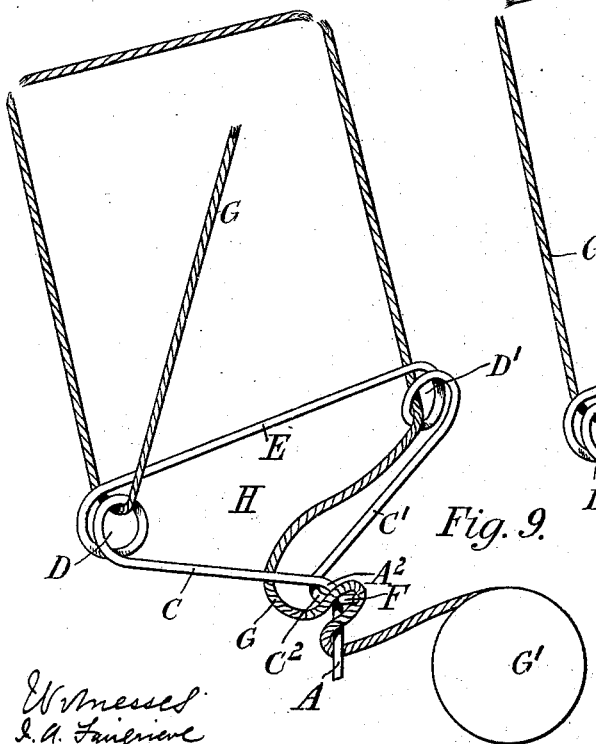

Fig. 9.

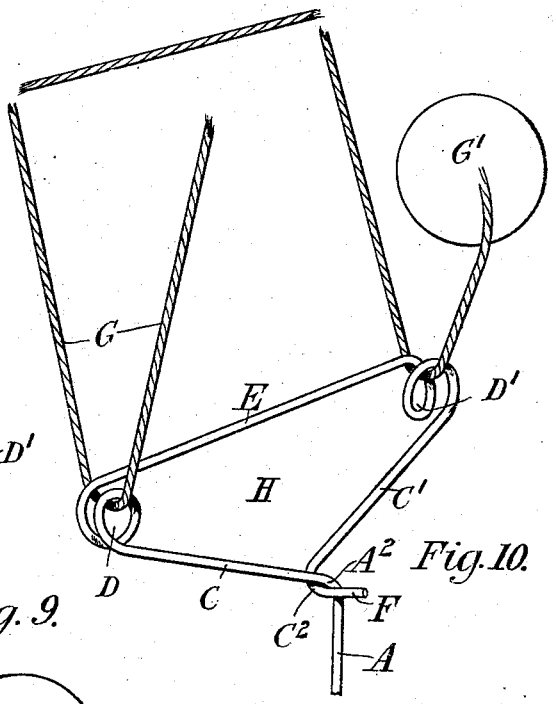

Fig. 10.

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STUMP FOR HOLDING HOP TRAINING STRINGS.

No. 553,235. Patented Jan. 21, 1896.

Fig. 11.

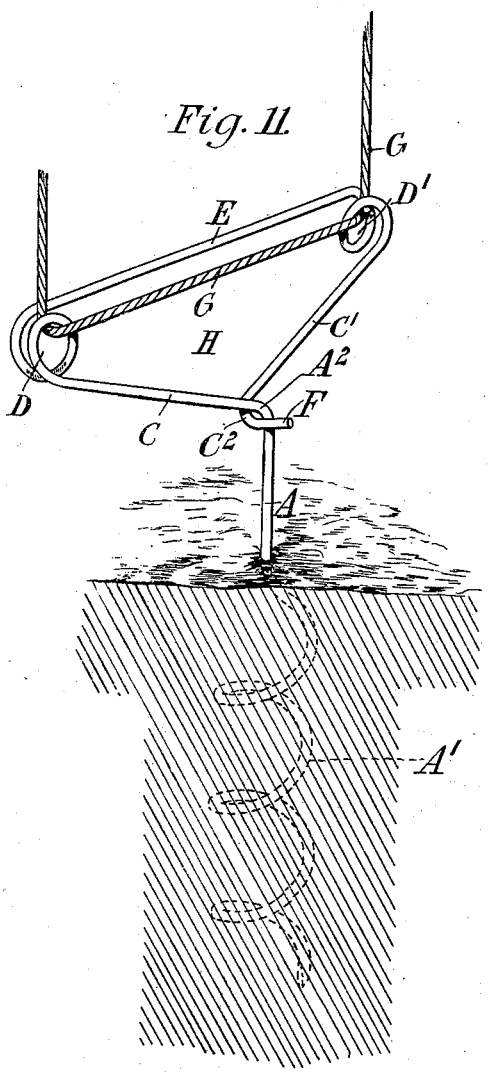
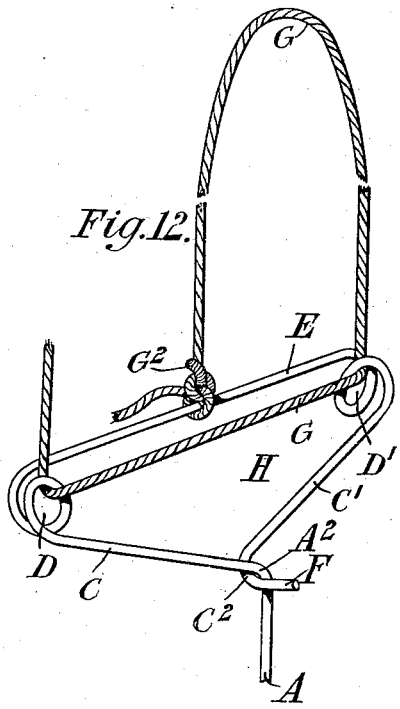


Fig. 12.



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UNITED STATES PATENT OFFICE.

ROBERT FULLER, OF EWHURST, ENGLAND.

STUMP FOR HOLDING HOP-TRAINING STRINGS.

SPECIFICATION forming part of Letters Patent No. 553,235, dated January 21, 1896.

Application filed February 14, 1895. Serial No. 538,360. (No model.)

To all whom it may concern:

Be it known that I, ROBERT FULLER, a subject of the Queen of England, residing at Ewhurst, Hawkhurst, England, have invented certain new and useful Improvements in or Relating to Stumps for Holding Hop-Training Strings, of which the following is a specification.

This invention relates to devices for holding the string or the like employed for hop-training and similar purposes and the manner of connecting the string thereto.

The invention will be best understood by reference to the accompanying drawings, in which—

Figure 1 is a perspective view of the stump or string-holding device. Figs. 2 to 10, inclusive, are perspective views showing the preferred manner of attaching the string to the stump; and Figs. 11 and 12 are perspective views showing alternative ways of attaching the string to the stump.

In Figs. 1 and 11 the lower part of the stump is shown in full and dotted lines respectively. In the other figures the lower part is not represented at all.

Like letters indicate like parts throughout the drawings.

The improved stump or string attaching or holding device constructed according to this invention, as shown in Figs. 1 and 11, is preferably constructed of stout hard tempered wire, galvanized, (though other material may be used if desired,) and at the lower part of the stem A by which it is intended to be fixed in the ground it is formed into a helix or screw A′, having a sharpened end so that it may be readily screwed into the ground and take such hold thereof by reason of its shape and of the roots of the hop-plant intertwining with the convolutions of the helix that it will not be likely to be drawn up by any wind-pressure on the twine or plants, although when desired it may readily be removed by unscrewing. At, say, about the part A^2 the stem A is deflected to one side so as to form an overhanging arm C, the end of which terminates in an eye or loop, uniting the arm C with the member E. This member E extends from the loop D across to a loop D′ at the side of the device opposite to that at which is located the arm C, and this loop D′ unites the member E with the arm C′, which extends down to the part A^2, where, by its portion C^2, it partly embraces the stem and terminates in a short arm or projection F. The wire is so coiled in forming the loops D and D′ as to leave sufficient space between the adjacent portions of the convolutions to admit of the free passage of the string G, Figs. 2 to 12, at those parts.

The string may be attached to the before-described device in many different ways, in most of which I attain the very important result of positively securing said string against accidental detachment. This result has been the aim of others besides myself; but up to the present no reliable means have been devised for the purpose. The stump or device shown on the drawings, moreover, readily adapts itself to the "Worcester," "Kent" or other systems of hop plantation employed, whether the string be continuous or non-continuous.

For convenience in describing the manner of threading the string through the loops D D′, I refer to the side at which the short arm F projects forward (that side presented in the drawings toward the reader) as the "front," the opposite one as the "back," and the sides at which the loops D and D′ are located as the "left" and "right" respectively. In other respects these terms have no significance, as either side of the device may be regarded as the front, back, left or right.

In threading the string G through the loops D D′ as it is unrolled from, say, a ball or equivalent, (shown diagrammatically at G′ in Figs. 2 to 10,) it is first led down from the usual overhead support (not shown in the drawings) to the front of the member E and arm C′, passed beneath the latter, around the back of the stem A, up at the right of and over the projection F, and under the arm C, all as shown in Fig. 2. The string is then pulled between the parts A^2 C^2, which normally under the resiliency of the wire are kept close together and constitute what is hereinafter referred to as a "spring-gate," so that the string passes directly through the loop H, as shown in Fig. 3. The string G is then drawn toward the left of the loop H and passed between the ad-

jacent portions of the convolutions of the loop D so that it will then appear as shown in Fig. 4. The string is next passed downward in front of the arm C′ behind the part A^2 of the stem A, around the back, left-hand side and front of the stem A, and upward at the right-hand side of and over the projection F, as shown in Fig. 5, so that when the leading end of the string or ball G′ is drawn first toward the left and afterward toward the back it will assume the position shown in Fig. 6, in which it is shown passing directly through the loop D. The string G is then led up and connected to the overhead support and then led down to the back of the device, passed beneath the arm C, over the projection F and behind the stem A, and then appearing as shown in Fig. 7. The string thus arranged is then, by its leading end, drawn taut, say, in an upward direction, so that it passes first between the spring-gate A^2 C^2 and then to the top of the loop D′, as shown in Fig. 8. After this the string is passed from left to right and downward between the adjacent portions of the convolutions of the loop D′, then toward the left and under the arm C, over the projection F, and around the left and back of the stem A, as shown in Fig. 9, so that when next it is drawn taut the string will pass directly through the loop D′, as shown in Fig. 10. The string is then led up to and connected to the overhead support and then led downward for connection to the next of the series of stumps.

The foregoing is a description of the method of stringing which would preferably be employed for what is known as the "Kent system,"—that is, the system in which four training-strings are employed for each plant—but it will be readily seen that if instead of leading the string after it has been passed through the loop D, as shown in Fig. 6, up to the overhead support it be passed directly through the loop D′ and thence led upward only two training-strings will be provided, as in the Worcester system.

After the string G has been fixed or arranged in the manner previously described it cannot, unless broken, become accidentally detached from the stumps—say, for example, under the influence of the wind, as is frequently the case with other arrangements—for, even supposing that the string becomes sufficiently slack to allow a bight or bend to pass over the projection F, subsequent tension would not draw the string in any direction which would release it from the loops D D′. Where this last-described provision is not necessary the improved stump may be used for the Worcester system by merely passing the string G from the under side of the loops D D′ upward between the adjacent portions of their convolutions, as shown in Fig. 12, in which case the string is somewhat tightly gripped by these parts.

When three training-strings are required for each plant I use the string in separate lengths, each length serving to string two stumps, by fastening one end of each, as at G^2, Fig. 12, to the member E, then leading it up and connecting it to the overhead support and then leading it down to the stump and passing it under the loops D D′, as shown in Fig. 12. If five training-strings are required from each stump the last-described arrangement is followed and the string between the loops D D′ is led up and connected to the overhead support.

The device may be modified without departing from the spirit of the invention. For example, instead of the loops D D′ being formed each of one convolution of the wire, as shown in the drawings, they may be formed of two or more convolutions, and, moreover, instead of the stumps being arranged for the holding of the strings at, say, five or six inches above or approximately close to the surface of the ground, as indicated in the drawings, they may be arranged for holding the strings at a greater height—for example, say, about four or five feet above ground, so as to admit of the ground being cultivated in both ways by horses if preferred. In an arrangement such as last described I may, if desired, use auxiliary strings leading from the loops D D′ down to or nearly down to the ground, so as to allow the plants to climb up these auxiliary strings to reach the main strings G.

The before-described device besides securing the important advantages above set forth also secures a further advantage over the devices hitherto used for the same purpose, for, whereas as in these only one part of attachment for the strings is provided and the strings all consequently diverge from this point and at this point are little or no better than one string as regards the training of the plant, in my improved device the strings or portions of the string are held apart so as to virtually present at least two, or it may be more, separate strings for the training of the plant.

I claim—

1. A device for holding training strings formed of a single length of wire bent to form separated loops and then bent downwardly to form a helical stem, substantially as described.

2. A device for holding training strings provided with separated loops and a spring gate through which the string is passed to engage the loops, substantially as described.

3. A device for holding training strings provided with separated loops, a spring gate through which the string is passed to engage the loops, and a projection adjacent to the gate, substantially as described.

4. A device for holding training strings consisting of the stem A, arms C C′, loops D D′, the member E and projection F, substantially as described.

5. A device for holding training strings consisting of the helical stem, the arms C C′,

loops D D′, member E and projection F, substantially as described.

6. A device for holding training strings consisting of a helical stem, arms C C′, spring gate A^2 C^2, loops D D′, the member E and projection F, substantially as described.

In testimony whereof I have hereto set my hand in the presence of the two subscribing witnesses.

ROBERT FULLER.

Witnesses:
ALFRED J. BOULT,
HARRY B. BRIDGE.