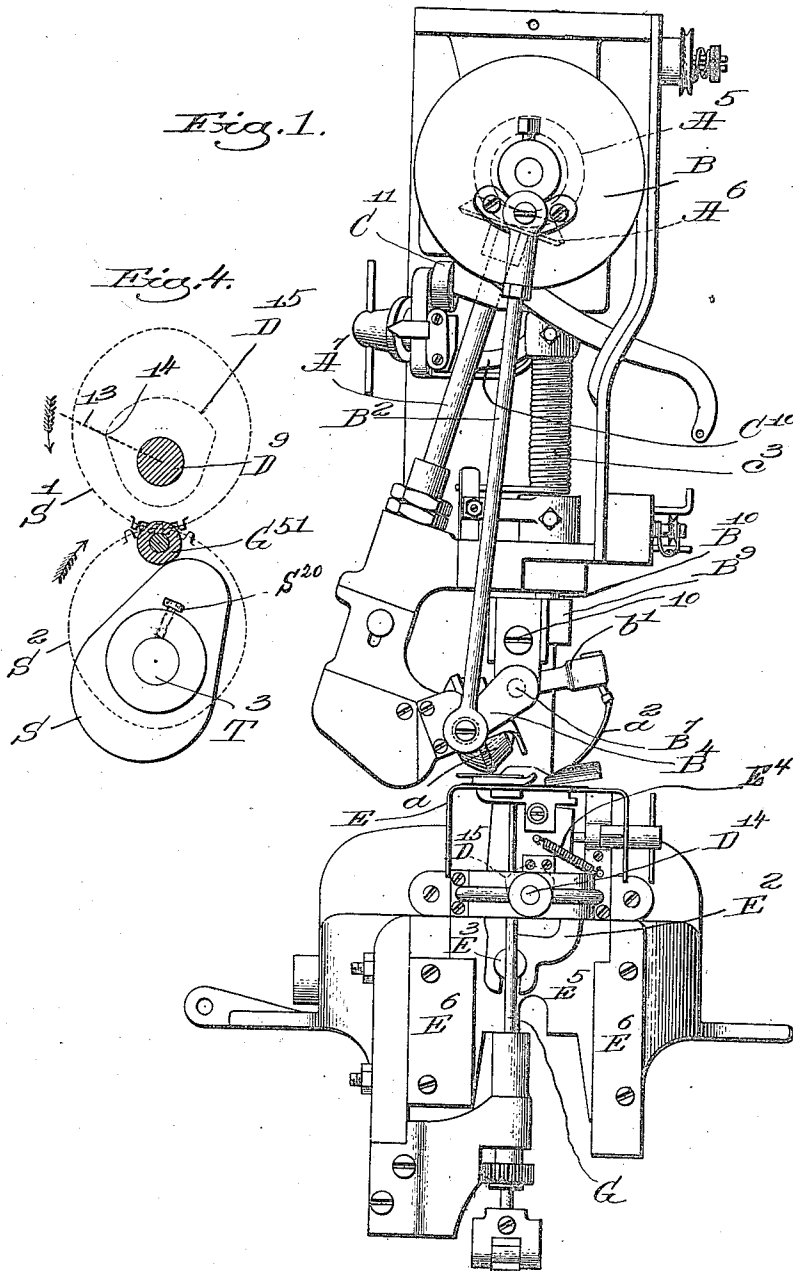


W. ARBETTER.
BLINDSTITCH SEWING MACHINE.
APPLICATION FILED FEB. 28, 1908.

1,059,966.

Patented Apr. 29, 1913.

2 SHEETS—SHEET 1.



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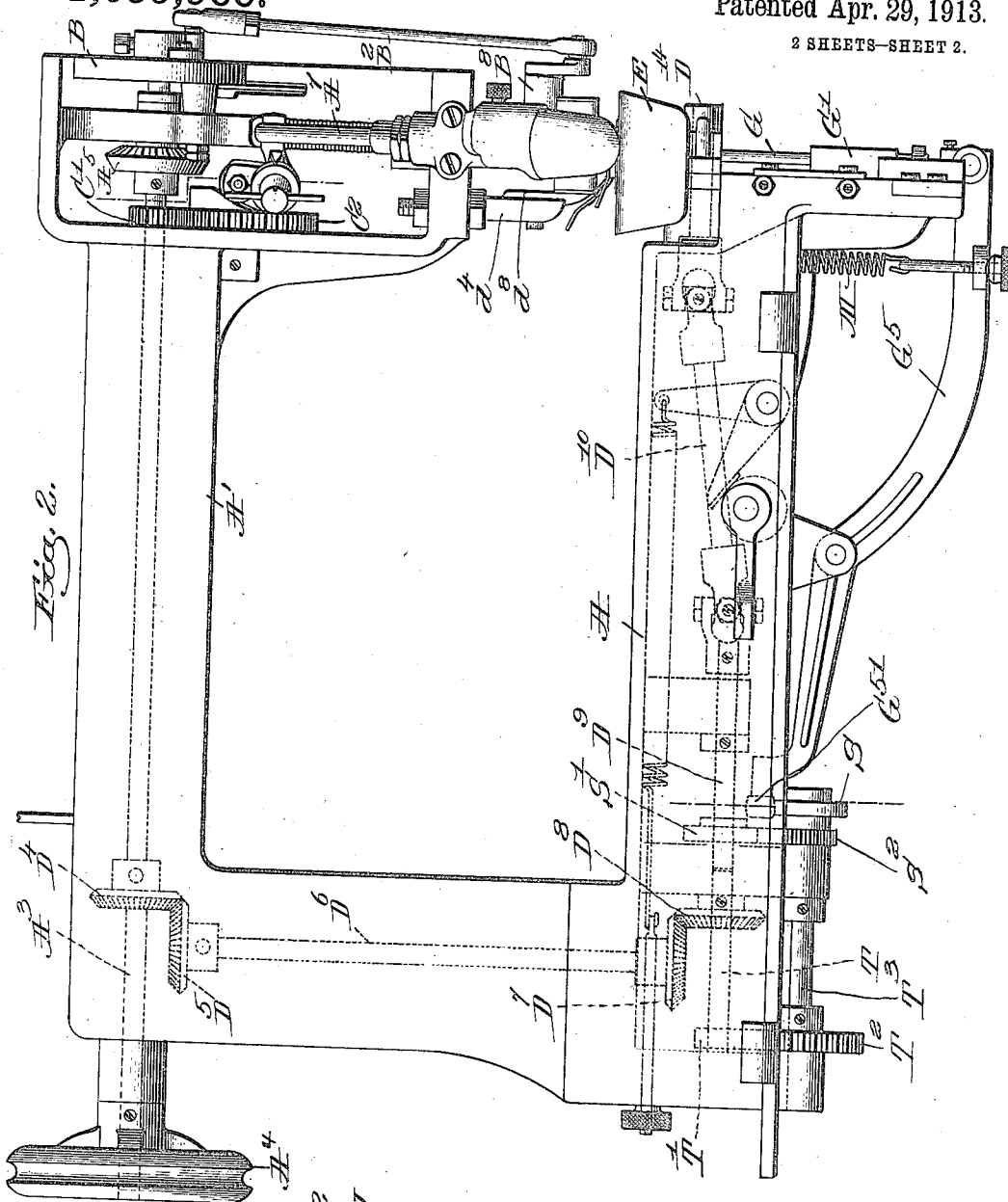
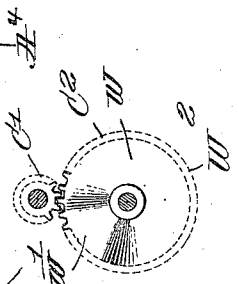


Fig. 2.

Fig. 3.



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BLINDSTITCH SEWING-MACHINE.

1,059,966.

Specification of Letters Patent.

Patented Apr. 29, 1913.

Application filed February 28, 1908. Serial No. 418,181.

To all whom it may concern:

Be it known that I, WOLF ARBETTER, a citizen of the United States, and a resident of Chelsea, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Blindstitch Sewing-Machines, of which the following description, in connection with the accompanying drawing, is a specification, like letters on the drawing representing like parts.

This invention relates to a sewing machine for making blind stitches, and in that embodiment of the invention illustrated is substantially of the general type shown in the patent to Arbetter No. 830,699, granted September 11, 1906.

The present invention is designed to secure a machine particularly designed for felling work, or the attachment to a base layer of the edge of a superimposed layer or layers, and in so doing to imitate closely hand felling work wherein a series of substantially straight, parallel stitches extending a short distance from the top of the superimposed layer over the edge thereof and at right angles or slightly oblique there-to alone are visible.

The invention will more fully appear from the accompanying description and drawings and will be particularly pointed out in the claims.

The drawings represent a sewing machine embodying the invention in its preferred form.

Figure 1 represents a front end elevation of the machine. Fig. 2 is a side elevation. Fig. 3 is a detail view to show the operation of the needle vibrating cam. Fig. 4 is a diagrammatic view to show the operation of the bender driving cam and the irregular motion of the feed.

The general construction of the machine is similar to that of the machine shown in the patent above referred to and need not therefore be described in detail. The base A and the overhanging arm A¹ are of suitable construction to support the operating parts. The main driving shaft A², operated by a pulley A⁴ extends through the overhanging arm and from it the various mechanisms of the machine are driven; the feeding and bender mechanism from the beveled gear D⁴; the needle vibrating mechanism from the pinion C¹; the looper or rotating hook mechanism from the beveled

gear A⁵; the needle reciprocating mechanism from the disk B.

In the form of the machine shown a curved needle a² is employed and is carried by an arm b¹ mounted on a needle-carrying rock-shaft B⁷, which extends through a bearing B⁸, which bearing is connected by the screw 10 to the block B⁹ connected to the vertically extending rock-shaft B¹⁰. The needle is given its reciprocations to form the stitch by the rocking of the shaft B⁷. This is secured by a rod B² eccentrically connected at its upper end with the disk B already described, and at its lower end with the rock-arm B⁴.

The needle is given a vibrating motion so that its paths of reciprocation may occur in different lines at the required times, and in the embodiment shown this vibrating movement is secured by a bodily oscillation of the needle from the vertical rock-shaft B¹⁰. The axis of the shaft B⁷ about which the needle oscillates in making its reciprocations, is set in the rear of the axis of the rock-shaft B¹⁰ so that the shaft B⁷ moves bodily on the arc of a circle about the vertical rock-shaft B¹⁰. The movement of the shaft B¹⁰ is secured in the form shown by the following means: A rotary face cam W is driven by the gear C² thereon, intermeshing with the pinion C¹ already described. An arm C¹⁰ extends from the rock-shaft B¹⁰ and carries the roller C¹¹, which rides against the face cam C², and is made adjustable on the arm C¹⁰ to vary the extent of movement given to the shaft B¹⁰ by the face cam C². A coiled spring c³ holds the roll C¹¹ up against the face cam and thus serves to move the shaft B¹⁰ in the opposite direction to the movement given it by the cam. From the detail shown in Fig. 3 it will be observed that the face cam W revolves one-third as fast as the driving shaft A², and is provided with a raised portion W¹, covering about one-third of its surface. Consequently it will be seen that the needle makes three reciprocations for each revolution of the cam W, and hence one of these reciprocations will occur while the needle is operating in one path due to the influence of the raised portion W¹, and the other two will occur while the needle is operating in the other path under the influence of the low portion of the cam W. The adjustments are so arranged that the latter two reciprocations

cations will take place in a straight line in the direction of the feed of the machine, and hence the remaining reciprocation, influenced by the raised portion W^1 in the cam, will take place in a line diagonal thereto.

The complemental stitch-forming mechanism is shown as a rotating hook a with inclosed bobbin case and bobbin, operating in a plane transverse and oblique to the paths of reciprocation of the needle in the line of the feed, and driven from the inclined shaft A^7 by the beveled gear A^6 intermeshing with the beveled gear A^5 already described. The hook is preferably arranged to make two rotations to each reciprocation of the needle, thereby enabling greater speed with the proper interlocking of the loops.

A suitable presser-foot, rigidly attached by its shank d^3 to the presser-foot carrier d^4 , adjustably supported from the overhanging arm, is provided and is of the general type shown in the said patent, being provided with means for guiding the edge, plain or folded, of a superimposed layer or layers of material with proper relation to the paths of the needle, and in such manner that when the needle makes its straight thrust it passes parallel and close to the said edge and into and out of the upper surface of the base layer.

The work-support E is mounted on a vertically-movable carriage E^5 , sliding in the ways E^6 , and carrying the feeding device E^2 , slotted at its lower end to rock and slide on the stud E^3 , mounted on the carriage E^5 . The feeding device is moved upwardly and forwardly by a cam D^{15} carried by the shaft D^{14} , mounted in bearings in the carriage E^5 , and is moved backwardly and downwardly by the spring E^4 .

The bender G , by means of which the cloth when below the line of reciprocation of the needle is pushed up into the path thereof so as to enable the needle to enter and emerge therefrom and make a blind stitch therein, is mounted to slide vertically in the bearing G^1 and operated by the bender lever G^5 . The lever G^5 receives its operation in one direction from the rotary cam S , a roll G^{51} on the end of the lever coöperating therewith, and in the other direction from a spring M connected thereto and to the base A .

The required operation of the feed and bender is secured as follows: A vertical shaft D^6 , mounted in the arm A' , is driven by a beveled gear D^5 from the beveled gear D^4 already described, and carries at its lower end a beveled gear D^7 engaging a beveled gear D^8 on and driving a stub-shaft T . The stub-shaft T carries at its opposite end a pinion T^1 , which in turn intermeshes with a gear T^2 mounted on a second and parallel stub-shaft T^3 . The relation of the pinion T^1 and the gear T^3 is that of one to

three, so that the shaft T^3 makes three revolutions for each revolution of the driving shaft and consequently each reciprocation of the needle.

The shaft for driving the feed cam D^{15} comprises a horizontal section D^9 and a section D^{10} connected at its ends by universal joints with the section D^9 , and the section D^{14} already described, so that the section D^{10} may rise and fall with the carriage E^5 . The section D^9 carries an elliptic gear S^1 , intermeshing with a corresponding elliptic gear S^2 , on the stub-shaft T^3 , and the cam S (already described) is mounted on the end of the stub-shaft T^3 .

The cam S and the elliptic gears S^1 , S^2 , and their relations may best be seen in the detail illustrated in Fig. 4. The cam S is so shaped as illustrated that during one rotation thereof by the shaft T^3 it will depress the bender twice, once for a sufficient period to enable the material to lie flat and undisturbed while the needle makes the diagonal stitch into the superimposed layer or layers, and once for a brief period while the feed takes place, and between these two depressions of the bender the cam acts twice to raise the bender and bring the material into the path of the needle in making its reciprocations to form the straight stitches.

The elliptic gears S^1 , S^2 are so arranged that the feed shaft D^9 is driven at its maximum speed when the bender is depressed after the needle has left the fabric in completing a straight stitch and before it has entered the fabric to make the succeeding straight stitch to allow the feed taking place, and at its minimum speed during the reciprocation of the needle to form the diagonal stitch, and the vibrations of the needle occurring before and after said diagonal stitch. The cams D^{15} and S are made adjustable on their respective shafts by suitable means such as set screws, one of which is illustrated at S^{20} , so that the desired timing may readily be secured. The position shown in Fig. 4 has been found to work very satisfactorily. Therein the feed cam D^{15} is, for convenience, illustrated as on the same axis as the shaft D^9 carrying the gear S^1 . In the position illustrated the feeding movement is shown as nearly completed which will happen when the radial line 13 through the high point 14 of the cam D^{15} reaches the horizontal and the roll G^{51} is shown as just starting off the high part of the cam S to allow the bender to rise. The cycle of operations of the machine includes, therefore, three reciprocations of the needle and the order in which the machine proceeds is, therefore, as follows: First, a reciprocation of the needle into and out of the fabric with the needle moving in a path determined by the flat surface W of the face

cam W^2 , the bender at that time being raised; second, a vibration of the needle into a different path of reciprocation; third, a reciprocation of the needle into and out of the fabric in the latter path of reciprocation determined by the raised portion W^1 of the face cam C^2 ; and hence as herein illustrated in a diagonal direction, the bender being depressed; fourth, a vibration of the needle back into the former path of reciprocation; fifth, a reciprocation of the needle into and out of the fabric with the needle moving in the former path of reciprocation determined by the flat surface W of the face cam C^2 , the bender at that time being raised; sixth, a quick feeding movement at high speed with the bender depressed. It will thus be noted that two straight stitches are taken in the same place and that the cycle of three stitches, straight, diagonal, straight, is completed each time before the feed takes place.

The result of the operation of the mechanism herein described will be that the thread will extend in short parallel lines from the points where the needle emerges from the upper surface of the superimposed layer near the edge, down over the edge to the interlocking point at the end of the straight stitches. The tension placed upon the thread will determine what thread lies on the surface of the superimposed layer, but it may readily be adjusted so that only the looper thread will show on the upper surface of the material, while the interlocking points of the thread at the ends of the straight stitches being close up against the edge of the superimposed layer will be drawn under and practically concealed thereby.

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

1. In a blind stitch sewing machine having a cycle of operations including three reciprocations of the needle, a reciprocating needle, complemental stitch forming mechanism and operating mechanism therefor, means for vibrating the needle laterally before and after every third reciprocation only, means for feeding the material, the said feeding means operating only after the reciprocation of the needle occurring after the second vibration.

2. In a blind-stitch sewing machine having a cycle of operations including three reciprocations of the needle, a reciprocating needle, complemental stitch-forming mechanism and operating mechanism therefor, means for vibrating the needle laterally before and after every third reciprocation, means for feeding the material after the reciprocation of the needle occurring after the second vibration, a bender to raise the material into the path of the needle, and means

to raise said bender and maintain it raised during the first part of the other two reciprocations of the needle occurring before and after said vibrations.

3. In a blind-stitch sewing machine having a cycle of operations including three reciprocations of the needle, a reciprocating needle, means for vibrating the needle laterally before and after every third reciprocation only, means for feeding the material after the reciprocation of the needle occurring after the second vibration, and complemental stitch-forming mechanism including a rotating hook and inclosed bobbin, and means for operating said hook to make two rotations to each reciprocation of the needle.

4. In a blind-stitch sewing machine having a cycle of operations including three reciprocations of the needle, a reciprocating needle, complemental stitch-forming mechanism, and operating mechanism therefor, means for vibrating the needle laterally before and after every third reciprocation only, means for guiding the edge of a superimposed layer parallel and close to the paths of reciprocation, whereby the said third reciprocation shall carry the needle into or beneath said edge and out from the upper surface of said layer, and the other two reciprocations of each cycle shall carry the needle into and out of the upper surface of the base layer close to and parallel with said edge, and means for feeding the material after the reciprocation of the needle occurring after the second vibration.

5. In a blind-stitch sewing machine having a cycle of operations including three reciprocations of the needle, a reciprocating needle, complemental stitch-forming mechanism, and operating mechanism therefor, means for vibrating the needle laterally before and after every third reciprocation, means for guiding the edge of a superimposed layer parallel and close to the paths of reciprocation, whereby the said third reciprocation shall carry the needle into or beneath said edge and out from the upper surface of said layer, and the other two reciprocations of each cycle shall carry the needle into and parallel with said upper surface of the base layer close to and parallel with said edge, and means for feeding the material after the reciprocation of the needle occurring after the second vibration, a bender to raise the material into the path of the needle, and means to raise said bender and maintain it raised during the first part of the reciprocations of the needle into the base layer.

6. In a blind-stitch sewing machine having a cycle of operations including three reciprocations of the needle, a curved reciprocating needle, complemental thread-carrying stitch-forming mechanism and operating mechanism therefor, means for bodily swing-

ing said needle laterally before and after every third reciprocation only, and means for feeding the material after the reciprocation of the needle occurring after the second vibration.

7. In a blind-stitch sewing machine having a cycle of operations including three reciprocations of the needle, a curved reciprocating needle, complementary thread-carrying stitch-forming mechanism and operating mechanism therefor, means for bodily swinging said needle laterally before and after every third reciprocation, means for feeding the material after the reciprocation of the needle occurring after the second vibration, means for guiding the edge of a superimposed layer past the needle so that the needle shall enter the folded edge diagonally in making one reciprocation, and shall enter the base layer close to and parallel with said edge in making the preceding and subsequent reciprocations, a bender to raise the material into the path of the needle, and means to raise said bender and maintain it raised during the first part of the reciprocations of the needle entering the base layer.

8. In a blind-stitch sewing machine having a cycle of operations including three re-

ciprocations of the needle, a driving shaft, a curved needle, connections between said shaft and said needle for giving one complete reciprocation of said needle to each rotation of said shaft, complementary stitch-forming mechanism, including a rotating hook, and connections between the same and said shaft for giving two rotations of said hook to each rotation of said shaft, means to allow of the bodily vibration of said needle, and connections between the same and the said shaft to cause a vibration back and forth to the said needle for each three rotations of said shaft, feeding mechanism, and connections between the same and the said shaft to give one feeding movement to each three rotations of the said shaft, a bender, and connections between the same and the said shaft to give two reciprocations of the said bender to each three rotations of the said shaft.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

WOLF ARBETTER.

Witnesses:

MABEL PARTELOW,
THOMAS J. DRUMMOND.