

(No Model.)

2 Sheets—Sheet 1.

E. S. CRAM & E. C. COVELL.
SEWING MACHINE.

No. 328,293.

Patented Oct. 13, 1885.

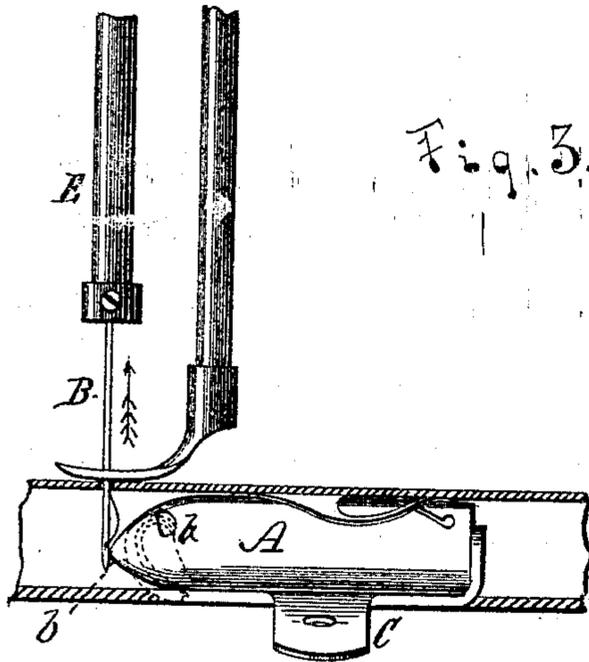
Fig. 1.



Fig. 2.



Fig. 3.



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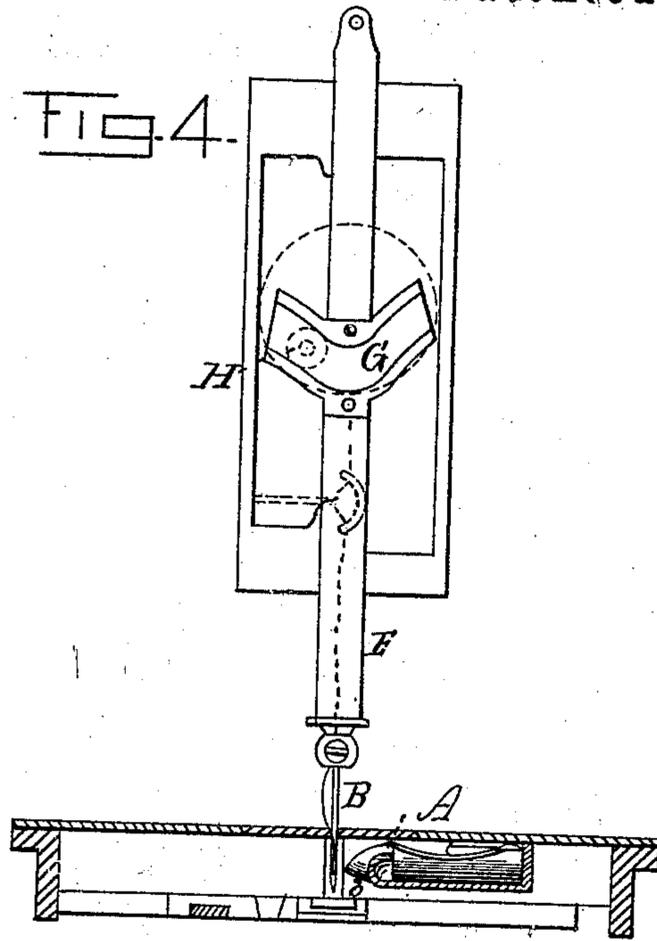
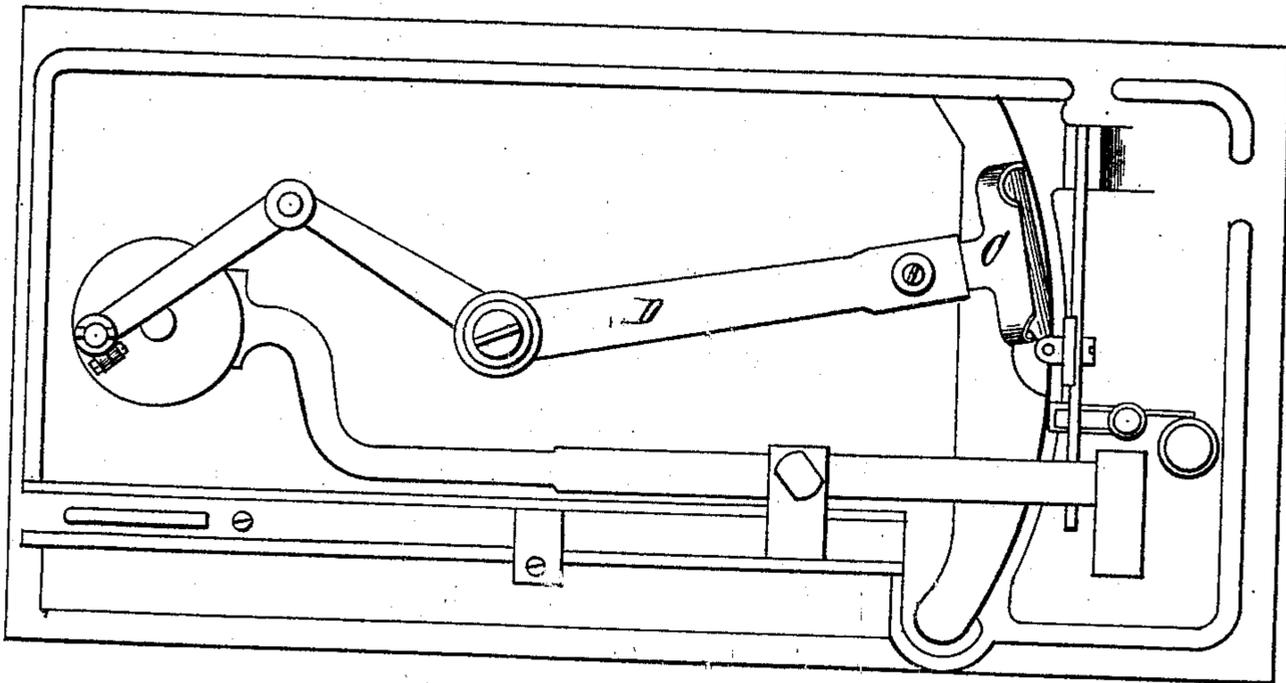


FIG. 5.



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UNITED STATES PATENT OFFICE.

ELISHA S. CRAM AND EDGAR C. COVELL, OF LACONIA, NEW HAMPSHIRE.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 328,293, dated October 13, 1885.

Application filed February 18, 1884. Serial No. 121,105. (No model.)

To all whom it may concern:

Be it known that we, ELISHA S. CRAM and EDGAR C. COVELL, of Laconia, in the county of Belknap and State of New Hampshire, have invented an Improvement in Sewing-Machines; and we do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification.

Figure 1 is a side view of the improved shuttle which forms a part of our invention; Fig. 2, a top view of the same; Fig. 3, a vertical section of a portion of a sewing-machine, taken through the shuttle-race thereof, and showing the shuttle in its relative position to the sewing-machine needle when the motion of the machine is reversed; Fig. 4, a vertical section of a sewing-machine plate back of the shuttle, looking toward the shuttle and showing also a side view of the needle, needle-bar, needle-bar cam, and the head block in which the needle-bar is mounted; Fig. 5, an under side view of the sewing-machine, showing the shuttle, shuttle-carrier, and parts connected therewith.

Like letters designate corresponding parts in all of the figures.

The purpose of our invention is to make a shuttle and so arrange it in relation to the needle and other working parts of the machine related to the shuttle in their movements that the said shuttle will not enter the thread-loop when the sewing-machine feeds backward, whereby the breaking of the thread is avoided, whether the machine is made to feed backward accidentally or purposely by reversing its motion.

In an application for Letters Patent filed by ELISHA S. CRAM, one of the present applicants, on the 11th day of January, 1884, Serial No. 117,136, there is described a new form of shuttle, which, together with a form of cam, operating the needle-bar and its needle, that will raise the said needle more quickly in the reverse than in the direct motion of the machine, will merely take the thread-loop around its point, and immediately thereafter will cast the loop entirely off again without fully entering the loop at all when the feed-motion of the machine is reversed, it being essential in feed-

ing the machine with a backward movement that the shuttle should not take the loop of the thread, which, if done, would break the thread. The forward end of the shuttle is therein shown and described as made very short, and obtusely pointed, so that the needle in rising would be high enough to draw the thread-loop off from the point of the shuttle after the same has partially entered the loop, the blunted end of the shuttle assisting in casting off the loop.

Our invention consists in a shuttle shortened in the forward end, or part in front of the shuttle carrier or basket, which will not in the backward motion of the sewing-machine reach the then ascending needle till the eye thereof reaches above the point of the shuttle, or until it has ascended high enough to prevent the shuttle from entering the loop, and making the point thereof below the center line or axis of the shuttle, as far as practicable without interfering with its properly entering the thread-loop when the machine is sewing, substantially as herein described, and shown in the drawings; and we so combine this shuttle with the shuttle-driving mechanism and needle that the shuttle shall not reach the needle in the backward-feed movement until the needle raises the thread-loop out of the way of the shuttle. This form of shuttle is used and combined with a needle-bar-raising cam or equivalent needle-bar-raising device whereby the needle-bar and needle are raised more quickly in the reverse motion than in the direct motion of the machine, as hereinafter set forth.

In the drawings, let A represent the shuttle, B the needle, and C the shuttle-carrier, of a sewing-machine; also in Fig. 5 is shown the lever-arm D, on which the shuttle carrier or basket C is mounted, and by the instrumentality of which, in connection with associate devices which operate the said arm, the said shuttle-carrier is actuated; and in Fig. 4 we show a part of the sewing-machine head and the cam G and cam-pin H (in dotted lines) by which the needle-bar E and needle B are raised and lowered. The drawings show the cam-pin as operating in that part of the cam G by which the needle-bar is raised in the reverse motion of the machine, it being raised by the opposite end of the cam when the machine is running

forward in sewing. The shuttle A, as shown in Figs. 1 and 2, has its forward end, *a*, shortened to the greatest practicable extent without too greatly blunting it for entering the thread-loop in sewing. The degree of shortening for most of the sewing-machines now in use is substantially as represented in the drawings. The extent of the shortening, as compared with ordinary shuttles, may be stated as from one-eighth to one-fourth of an inch in the part forward of the front horn of the shuttle-carrier. We shorten only as much as necessary, taken in connection with the lowering of the point of the shuttle, to effect the purpose herein set forth; and in this specification, when we speak of the shuttle as shortened at its point, or in the part forward of the shuttle-carrier, we mean to be understood a shuttle shortened to substantially the extent above set forth, and sufficient to effect the purpose herein specified; also, the point *b* of the shuttle is made below the longitudinal center line, substantially to the extent shown in Figs. 1 and 3, so that the retardation of the shuttle in reaching the needle, by shortening the forward end, is assisted in the final effect by thus lowering the point below the thread, as shown in Fig. 3, it being evident that by thus lowering the point the shuttle may correspondingly be advanced without entering the thread loop; also, the movement of the shuttle is to be as much retarded as practicable without interfering with the proper timing of the shuttle with the needle in sewing. This we cannot exactly define, since little change can be made in that respect from the arrangement or adjustment usually adopted in sewing-machines; but we take advantage of all the assistance that can be thereby gained in accomplishing the desired purpose.

In Fig. 4 we show the ordinary construction of the needle-bar-raising cam G, wherein it is seen that the end of the cam which raises the needle-bar, when the motion of the machine is

reversed, as indicated by the dotted cam-pin operating therein, is lower than the other end of the cam, by which the needle-bar and needle are raised when the machine is running forward in the regular way, and thus it is seen that in this reverse motion the needle-bar and needle are raised more quickly than in the forward motion of the machine, wherein the raising of the needle is specially retarded to allow time for the shuttle to enter the loops of the needle-thread. We therefore in this invention take advantage of this acceleration of the raising of the needle-bar and needle in the reverse motion of the machine to effect the purpose desired by the form of shuttle herein specified. In Fig. 3 we show the shuttle A with its point just reaching the needle B in feeding the sewing mechanism backward, the needle then ascending, as indicated by the arrow. It will be seen that with the construction of shuttle shown the shuttle clears the thread-loop in this movement, and does not enter it even with its point.

We claim as our invention—

In a sewing-machine wherein the needle-bar and needle are raised more quickly in the reverse than in the forward motion of the machine, the combination, with the shuttle-carrier, needle, needle-bar, and means, as the cam G and cam-pin H, for raising the needle-bar and needle, of a shuttle, A, formed with its front end forward of the shuttle-carrier shortened, and its point located below its longitudinal central line or axis, substantially as described and shown, whereby the shuttle is adapted to pass outside of the needle-thread loops in the reverse motion of the machine, for the purposes herein set forth.

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