No. 777,074. PATENTED DEC. 13, 1904.

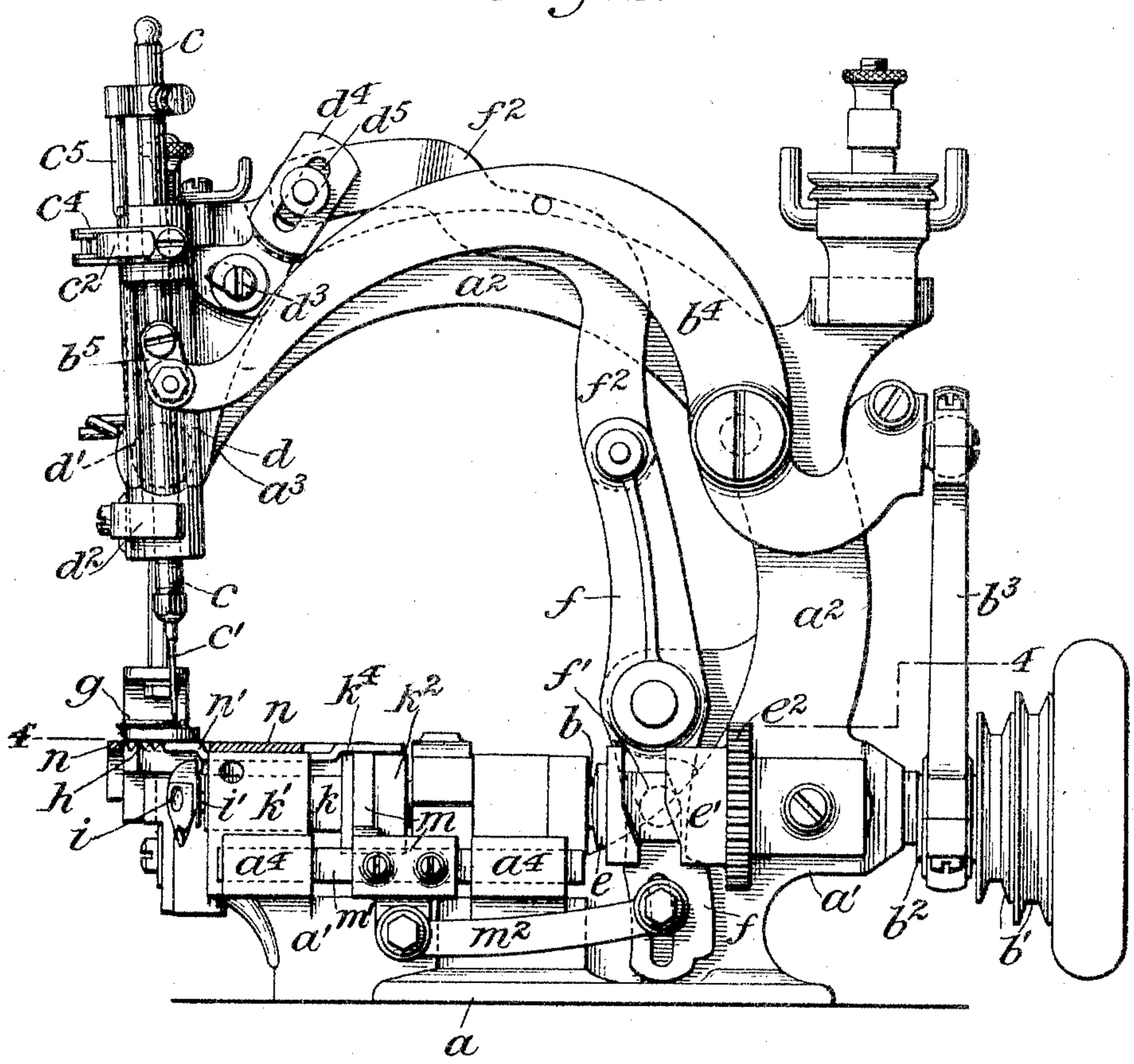
L. BULASKY.

ZIGZAG STITCH SEWING MACHINE.

APPLICATION FILED JULY 16, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.



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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 2.

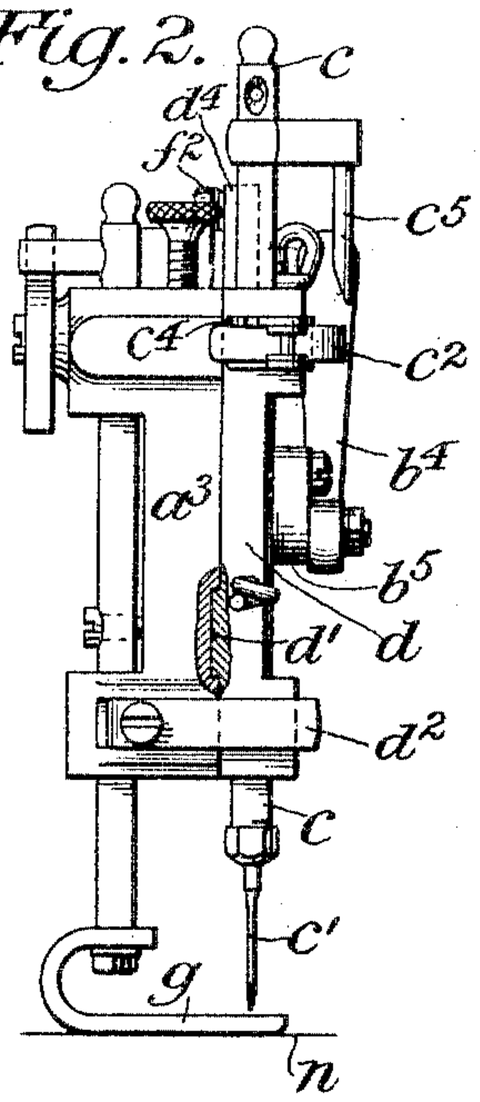


Fig. 3.

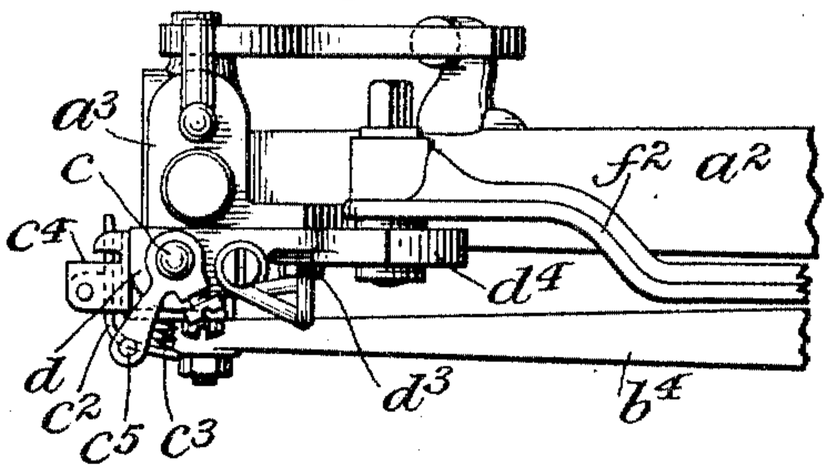


Fig. 5.

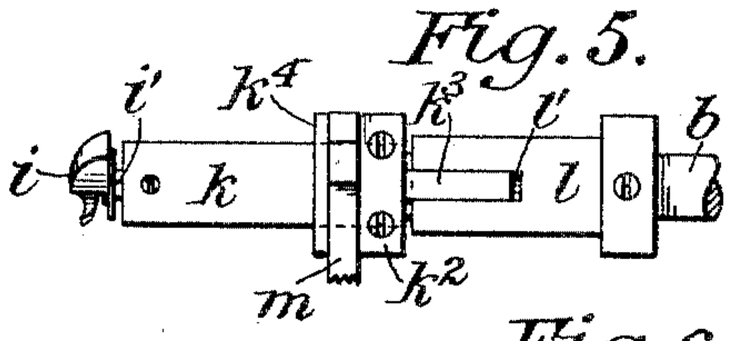


Fig. 6.

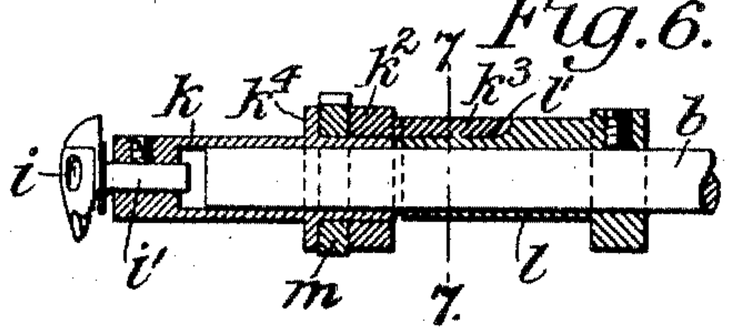
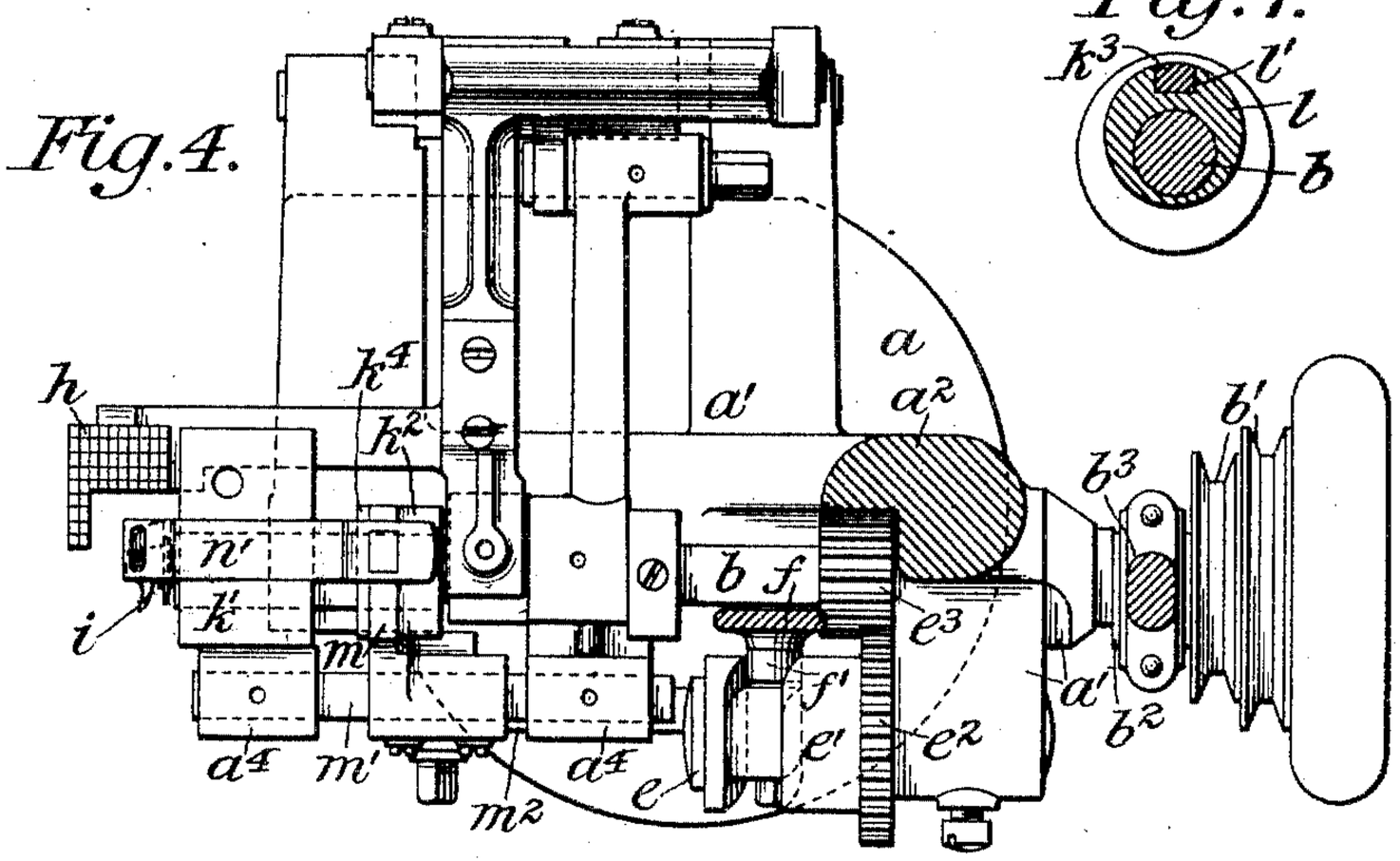


Fig. 7.

Fig. 4.



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UNITED STATES PATENT OFFICE.

LOUIS BULASKY, OF NEW YORK, N. Y.

ZIGZAG-STITCH SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 777,074, dated December 13, 1904.

Application filed July 16, 1903. Serial No. 165,756. (No model.)

To all whom it may concern:

Be it known that I, LOUIS BULASKY, a citizen of the United States, residing in the borough of Manhattan, of the city of New York, in the State of New York, have invented certain new and useful Improvements in Zigzag-Stitch Sewing-Machines, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

The object of this invention is to produce a machine of improved construction for diagonal or cross stitching such as is used in the stitching together of straw braid to make hats and for securing wire binding at the edges of straw, buckram, and felt hats, and for other like purposes.

The improvements have been designed with especial reference to their application to single-thread machines and so far as they relate to the looper mechanism are particularly adapted for use with machines of this class; but the devices for supporting and operating the needle and other devices, to be referred to hereinafter, are applicable to other types of machines as well as single-thread machines.

One object particularly in view in addition to the improvements of the mechanism for imparting to the needle-bar the desired motion is to leave the space beneath the arm of the machine unobstructed, so that it shall be possible, for example, to stitch an entire hat from crown to brim.

Another particular object is to provide ample bearing for the looper-shaft and to improve the means for driving the same, so that the movement of the looper shall always be true.

Other features of improvement will be more particularly referred to hereinafter.

The several features of the invention as illustrated in the accompanying drawings for purposes of explanation are applied to a machine of the single-thread type, and in said drawings—

Figure 1 is a view in side elevation of such a machine. Fig. 2 is an end view of the parts above the bed-plate. Fig. 3 is a plan view showing the outer end of the arm, the needle-bar, and associated parts. Fig. 4 is a plan view of the parts below the bed-plate, the arm of the pitman being shown in section. Figs. 5 and 6 are detail views in elevation and partly in longitudinal section of the looper-shaft and its associated parts. Fig. 7 is a detail transverse section on the plane indicated by the line 7 7 of Fig. 6.

The machine shown in the drawings is provided with a base a, adapted to rest upon a suitable table and carrying a frame a', which, together with the usual arm a^2, supports the working parts of the machine. The main shaft b is mounted in suitable bearings in the frame and is provided, as usual, with driving-pulleys b' and with the eccencric b^2, which through the pitman b^3, lever b^4, and link b^5 imparts to the needle-bar c its vertical or substantially vertical reciprocation.

The needle-bar c, arranged to carry the needle c', as usual, is mounted to reciprocate in a substantially vertical direction in a frame d, the latter being mounted to oscillate in a plane parallel with the arm a^2 about a horizontal axis. To this end it has a short stud or lug d', engaging a corresponding seat in the head a^3 of the arm a^2, being held in place by a clip d^2 and a screw and washer d^3. The frame d is oscillated, so that the needle shall be directed first to one side and then the other by suitable devices provided therefor, as will now be described. Upon a stud e, secured to the frame a', is mounted a cam e', having formed therewith or secured thereto a gear e^2, which is engaged by a pinion having half the number of teeth mounted on the main shaft b, so that the cam receives a complete rotation for two complete reciprocations of the needle-bar. The cam e' is engaged by a stud f' on a lever f, suitably mounted on the frame of the machine. A link f^2 connects the upper end of the lever f with an arm d^4 of the frame d, said arm being slotted, as at d^5, to permit of proper adjustment of the connection between the link f^2 and the arm d^4. As will be understood, the cam is so formed that a long dwell follows each lift, whereby the lateral movement of the needle takes place only when the needle is at or near the high-

est point of its stroke, while at other points of its stroke the needle is held from lateral movement.

As a convenient device for relieving the tension upon the thread during the lower portion of the stroke of the needle for the proper action of the looper a bent finger c^2 is pivoted upon the frame d, near the upper end thereof, and is pressed by a spring c^3 against the thread, which passes through a guide c^4 provided therefor, as clearly shown in Figs. 2 and 3. A finger c^5 is mounted upon the needle-bar c to coöperate with the finger c^2 during the downward movement of the needle-bar to move the same against the spring c^3, and so relieve the tension upon the thread.

The machine is provided, as usual, with a presser-foot g and with a feeder h, both of which parts are constructed and operated substantially as usual in machines of this character and need not be further described herein.

The looper i, which is itself also of usual construction, is mounted upon a stud i', which is secured, preferably by a set-screw in order that it may be removed when necessary, in the end of a hollow shaft k, which has a long bearing at k' in the frame a'. The looper must reciprocate in synchronism with the lateral movements of the needle while rotating in synchronism with the vertical movements of the needle. To provide for the rotation of the looper, there is secured thereon a collar k^2, bearing a finger k^3, which engages a slot l' in one of the cams l, which is mounted upon the main shaft b and has to do with the feed motion. The shaft b, as will be observed by reference to Fig. 6, is extended into the hollow shaft k to afford additional bearing therefor, and so prevent any possible wabbling or unsteady motion of the looper. For the reciprocation of the looper in the direction of its axis of rotation the shaft k is engaged between the collar k^2 and a second collar k^4, fixed or formed thereon by a yoke m, which is carried by a rod m', arranged to reciprocate longitudinally in suitable bearings a^4 on the frame a'. The rod is connected by a link m^2 with the extended lower end of the lever f and is consequently reciprocated by the cam e' in synchronism with the lateral movements of the needle, which are also derived from the same source. As clearly shown in Fig. 1, the lower end of the lever f is slotted to permit of the proper adjustment of the connection of the link m^2, so that the movement of the looper shall correspond in extent with the lateral movement of the needle.

In the operation of the improved machine it will be understood that it is provided with a suitable bed-plate, (shown in section at n in Fig. 1,) a throat-plate n', and with a suitable guide and gage to direct the work to the needle and maintain it in proper relation therewith. As will also be understood, such guides and gages will be changed or adjusted according to the particular character of the work to be done, as is usual in machines of this character. When power is applied to the machine, the needle-bar will be reciprocated from the eccentric b^2 on the shaft b, as usual, and at the same time the frame d, in which the needle-bar is guided, will be oscillated upon its horizontal axis through the action of the cam e'. As will be observed by reference to Fig. 1, the support of the needle-bar by the oscillating frame d and the described arrangement of the means for oscillating such frame permits practically the whole space beneath the arm of the machine to be unobstructed, so that a considerable amount of finished work can be passed beneath the arm, if necessary, as in the stitching together of straw braid to form a hat. At the same time the required movements of the needle are certain and are easily effected. The frame swinging upon an axis which is close to the needle-bar and prolonged substantially intersects the axis of the needle-bar. One downward movement of the needle is made to the right of the median line and the next downward movement is made to the left of the same line, so that the thread is carried by the needle to form diagonal or cross stitches. The looper i and its shaft k meanwhile are rotated through the direct connection with the main shaft b, the rotation of the looper being in synchronism with the vertical movements of the needle-bar. At the same time the looper and its shaft are reciprocated in the direction of the axis of rotation and keep pace with the lateral movements of the needle through the described connections with the cam e', the movements of the looper being positive and absolute by reason of the provisions made for supporting the looper-shaft during its movements. The action of the tension-finger c^2 will be readily understood.

Obviously the several improvements herein described, reference being had particularly to the means for imparting to the needle its required lateral movements, the means for supporting and actuating the looper, and the tension devices, while coöperating in the machine shown in the drawings in the production of a diagonal or cross stitch, are severally capable of use in other machines of the same or similar character in connection with other devices. It will also be obvious that various changes in the details of construction of these devices can be made without departing from the spirit of the invention.

I claim as my invention—

1. In a sewing-machine, the combination of a frame, a main shaft, a hollow looper-shaft having a bearing in the frame and a bearing upon said main shaft, a sleeve fixed to said main shaft, a finger fixed to said looper-shaft and having a sliding engagement with said

sleeve, and means to reciprocate said looper-shaft in the direction of its axis, substantially as described.

2. In a sewing-machine, the combination of a main shaft, a looper-shaft having a bearing in the frame and having an engagement with the main shaft whereby it is rotated therewith and is free to move longitudinally with respect thereto, a yoke engaging said looper-shaft, a rod mounted to slide in fixed bearings and carrying said yoke, a cam driven from the main shaft and a lever-and-link connection between said cam and said sliding rod, substantially as described.

3. In a sewing-machine, the combination of a main shaft, a hollow looper-shaft having a bearing in the frame and upon the main shaft, a looper having a stud fixed in said looper-shaft, means intermediate the main shaft and the looper-shaft to rotate the looper-shaft, and means intermediate the main shaft and looper-shaft to reciprocate the looper-shaft, substantially as described.

This specification signed and witnessed this 14th day of July, A. D. 1903.

LOUIS BULASKY.

In presence of—
ANTHONY N. JESBERA,
LUCIUS E. VARNEY.