2 Sheets—Sheet 1.

J. A. DAVIS.

Sewing Machine.

No. 93,065. Patented July 27, 1869.

Fig. 1.

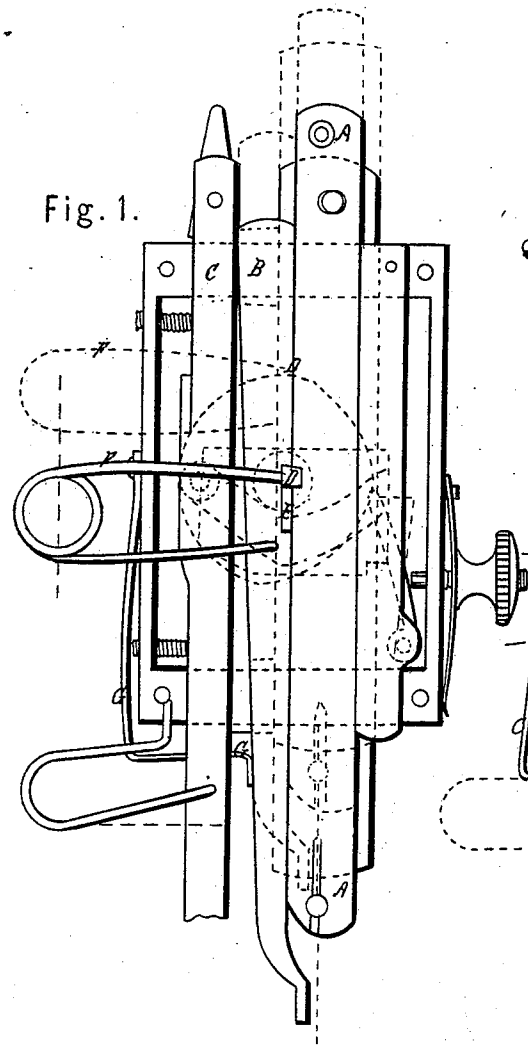
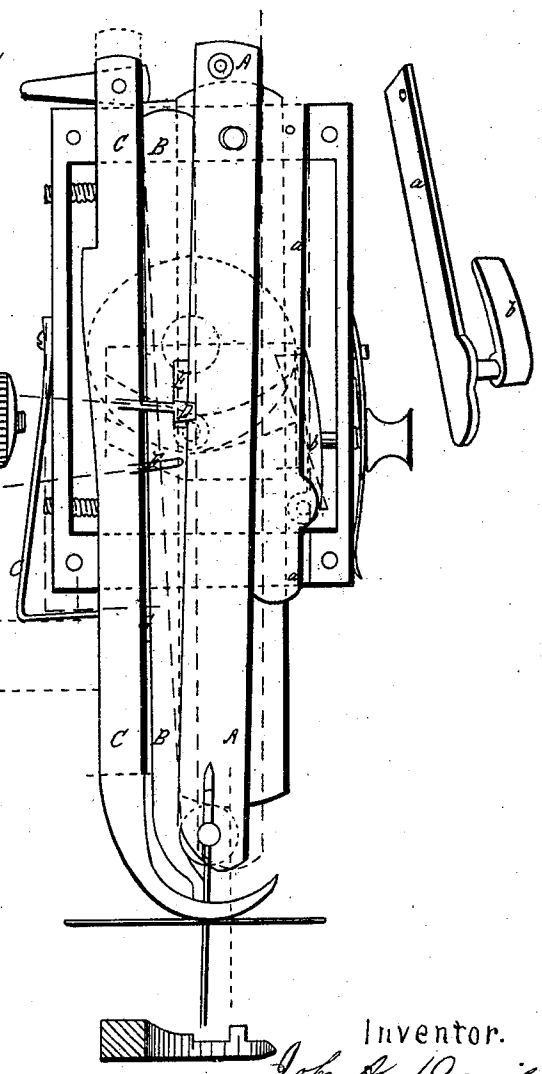


Fig. 2.



Witnesses.

Frank Hamilton

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his attorneys.

2 Sheets—Sheet 2.

J. A. DAVIS.

Sewing Machine.

No. 93,065. Patented July 27, 1869.

Fig. 5.

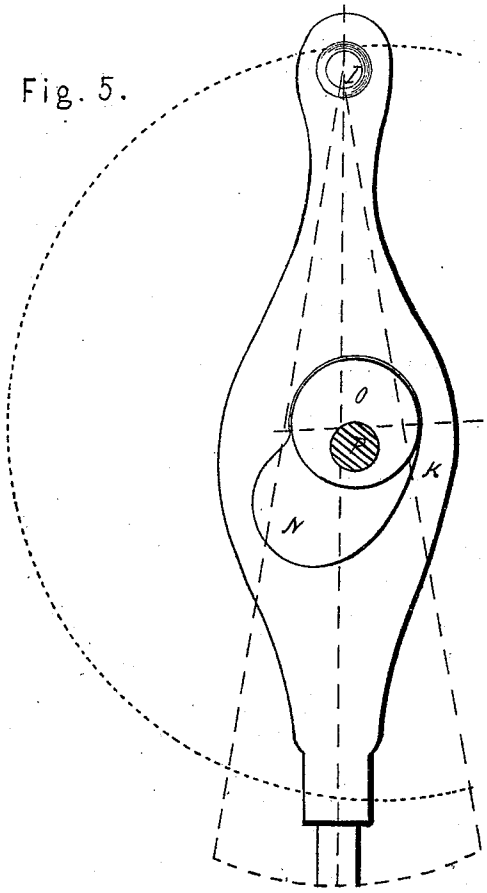


Fig. 4.

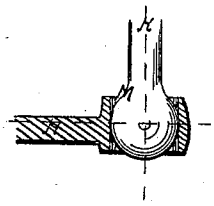
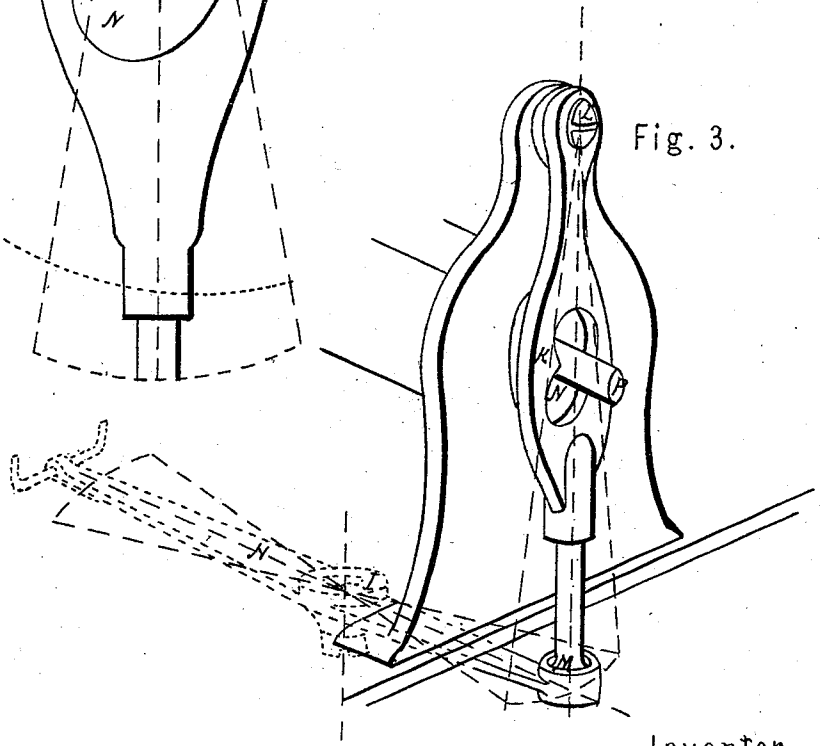


Fig. 3.



Witnesses.

Frank Hamilton

P. Halstead

Inventor.

Jobn A. Davis

by Crosby, Halstead & Gould

his Attorneys

United States Patent Office.

JOB A. DAVIS, OF WATERTOWN, NEW YORK.

Letters Patent No. 93,065, *dated July* 27, 1869.

IMPROVEMENT IN SEWING-MACHINE.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, JOB A. DAVIS, of Watertown, in the county of Jefferson, and State of New York, have invented certain Improvements in Sewing-Machines; and I do hereby declare that the following, taken in connection with the drawings, which accompany and form part of this specification, is a description of my invention, sufficient to enable those skilled in the art to practise it.

My improvements relate to the means for actuating the helper-bar in needle-feed sewing-machines, and also to the means for actuating the shuttle-driver.

In my Letters Patent of October 9, 1866, the helper-bar is operated by means of a swell or cam-like projection on one edge of the needle-bar, at or near its top; an inclined slot in the helper, and a pin in the presser-bar, permitting the downward and lateral motions of the helper against the force of a side spring.

The action of the helper is not, in such construction, necessarily positive in its action, but may fail to perform its duty.

In my present improvement, I dispense with the swell, the inclined slot, the pin on the presser-bar, and the laterally-pressing spring, and employ instead simply a side projection on the needle-bar, and a recess in the adjacent side of the helper-bar; a spring secured to both bars tending to keep this projection against the upper side of the recess.

In Figures 1 and 2,

A represents the needle-bar;

B, the helper-bar; and

C, the presser-bar.

D is the projection;

E, the recess in the helper-bar, in which this projection plays during part of its range; and

F the spring, exerting a force constantly tending to press the helper down and the needle-bar upwards, relatively to each other.

The helper is located between the needle-bar and the presser-bar, and hence is made narrower towards its lower end, to permit the proper lateral movements. It is operated entirely by the needle-bar.

The operation of the above-described parts is as follows:

When the needle-bar ascends, the projection D, pressed as it is against the upper ledge or side of recess E, by force of spring F, (see these parts in full lines in fig. 1,) acts by necessity positively upon the helper, and compels it to rise with it as far as it goes, as is indicated by dotted lines of these parts in the same figure.

When the needle-bar descends, the force of spring F, which is made of sufficient power for such purpose, operates to carry the helper down coincidently with the needle-bar, and thus preserve their original relative positions until the helper comes in contact with the table or the fabric thereon.

The further descent of the needle, and until it reaches its extreme lowest point, does not actuate the helper, nor is it impeded by the helper, for the reason that the slot in the latter gives free play for this further descent, by permitting the projection D to descend in slot E, and the resilience of spring F being the only resistance offered to such descent.

The slot E is made of sufficient length to meet all the demands of the machine; and in fig. 2 the positions of these parts are shown relatively to each other, when the needle-bar has about reached its lowest point of descent; the helper at this stage resting on the cloth, and the projection D having nearly reached the lowest part of the slot.

The helper, as is well known, is employed to aid the needle-feed, by moving laterally with the needle, but in advance of it, in order to keep the fabric smooth, and prevent its bunching in front of the needle, in the line or direction of its feeding-movement. To work efficiently, therefore, it is apparent that it should act upon the cloth in close proximity to the needle, or as near as practicable; and, further, that there should be no intervening device, such as a presser-foot, for example, between it and the needle, and which could bear down upon the cloth, and so disturb or prevent the helper from performing its assigned duty.

The bottom or acting surface of the helper should also be unyielding, and preferably of metal, in order that it may not, as when shod with leather, rubber, or any similar material, move forward a portion of its traverse without having any pulling-action upon the fabric, and so allow the same to form a gather or bulge between the needle and such yielding or compressible material.

In my construction, as shown in the drawings, these important requirements have been regarded, and the helper is shown as located entirely, its acting bottom surface being immediately near the needle, being also of the same metal as the bar itself, and the presser-bar being so located as to be outside the helper-bar.

The movement of the needle laterally, for the purpose of feeding, is imparted from a cam on the main shaft, in a manner similar to that in my patent before named, and, therefore, need not be particularly described; and proper provision is also similarly made for the regulation of the extent of feed. The movement of the needle-bar, when feeding, pushes the helper accordingly, and both are restored to their normal positions by force of spring G.

It will be observed that the helper-movement, both up and down, is positive and certain.

That portion of my invention relating to the shuttle-driving devices is illustrated in Figures 3, 4, and 5, in which H indicates the shuttle-driving lever, turning on a centre, I, and K a pendulous lever, hung at L; these two levers being both entirely rigid, (as distinguished from the devices for actuating the shuttle, as

shown in my patent of February 21, 1860;) and they are further distinguished from them by being connected together by a ball-and-socket joint, M, shown also in section in fig. 4.

The lever L has a somewhat heart-shaped slot, N, as shown, to receive the cam or eccentric, O, on the end of the main shaft P, which eccentric, in its revolution within the slot, imparts a vibratory motion to lever K, whose ball at its lower extremity actuates, by means of the socket, the outer arm of lever H.

In view of the known delicacy and sensitiveness of the sewing-machine, and the necessity of great accuracy, precision, and steadiness and uniformity of motion of all its parts, the advantage and need of this mode of connecting the two levers will be readily perceived.

The motion imparted to the shuttle-driving lever is positive under all conditions, with no yield or spring, no jarring, no looseness of action, no undue straining of any of the parts, or their connections; the well-known characteristics of the ball-and-socket joint having been discovered by me to be peculiarly adapted for making this connection of the two levers, one of which works in a plane about or quite at right angles with the other, inasmuch as it admits, within the range of motion required, of the ball on lever K describing an arc in one of such planes, whilst the socket on the other lever describes an arc in the other of such planes, a slight outward play being allowed of lever K on its fulcrum-pin, whilst the close and constant connection of the ball with the socket is at no time disturbed, and there is no play or lost motion between the levers at their point of junction.

There is also more durability and stability, and the motion is more easily and accurately obtained.

There is also great advantage over an ordinary universal-joint connection, as the action is more positive and reliable, there is no lost motion, and the slipping, jerking, and wabbling of such connections are avoided.

I claim the combination of the needle-bar with the helper-bar, by means of a projection on the one and a recess on the other, a spring serving to force the two in opposite vertical directions, when the helper-bar is arranged between the presser-bar and needle-bar, and its metallic acting surface is in immediate proximity to the needle, substantially as and for the purpose described.

I also claim the combination of the shuttle-driving lever H, vibrating in one plane, with its motor-lever K, vibrating in another plane, and hung so as to be free to move in a plane transverse of the plane of its vibration, when such levers are connected together by a ball-and-socket joint, as shown and set forth.

JOB A. DAVIS.

Witnesses:

JOHN J. HALSTED,

FRANK HAMILTON.