(No Model.) 5 Sheets—Sheet 1.

E. WISEMAN.

STRAW BRAID SEWING MACHINE.

No. 565,585. Patented Aug. 11, 1896.

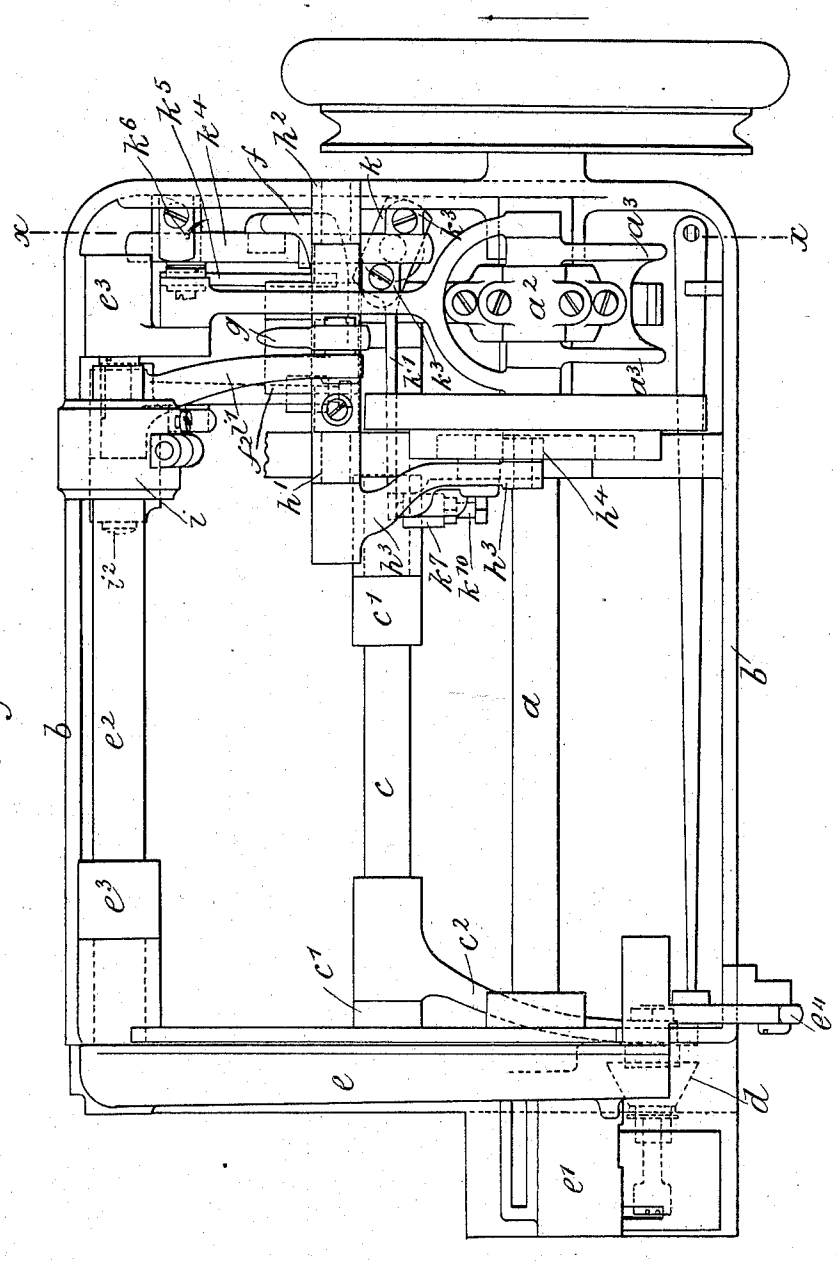

Fig. 1.

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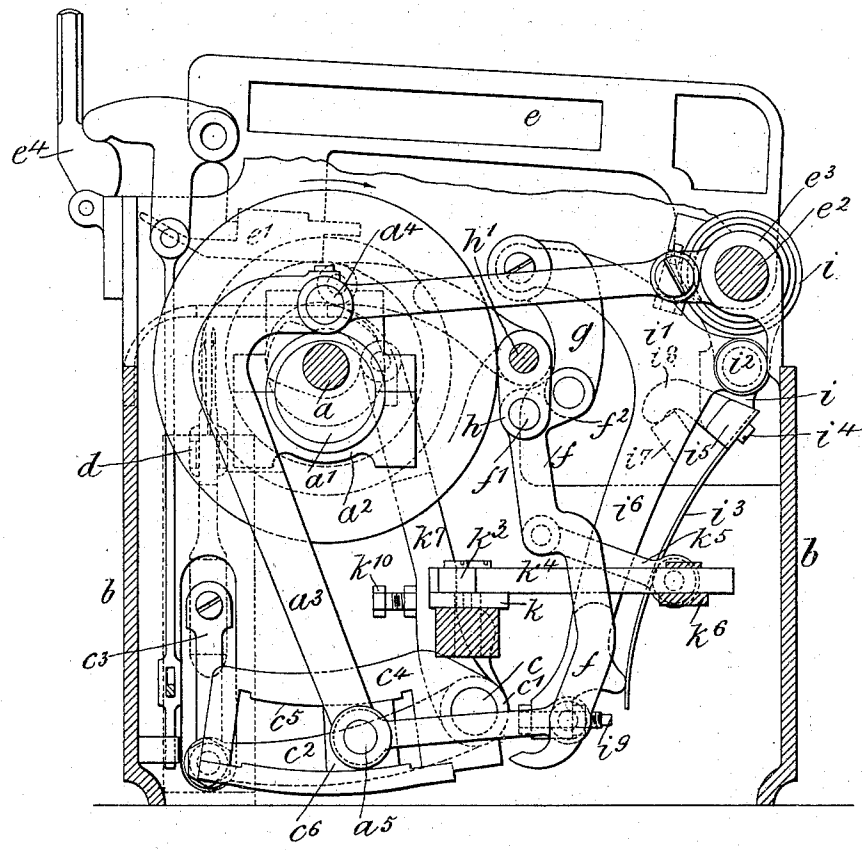
E. WISEMAN.

STRAW BRAID SEWING MACHINE.

No. 565,585. Patented Aug. 11, 1896.

Fig. 2.



Witnesses
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(No Model.)

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E. WISEMAN.

STRAW BRAID SEWING MACHINE.

No. 565,585. Patented Aug. 11, 1896.

Fig. 3

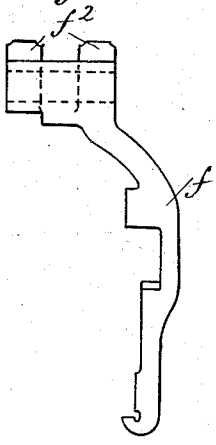


Fig. 4.

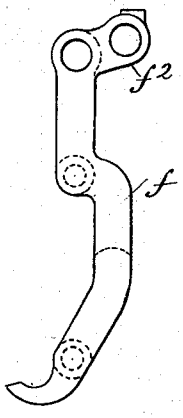


Fig. 5.

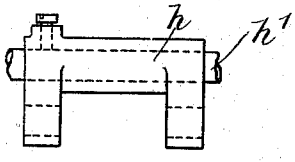


Fig. 6.

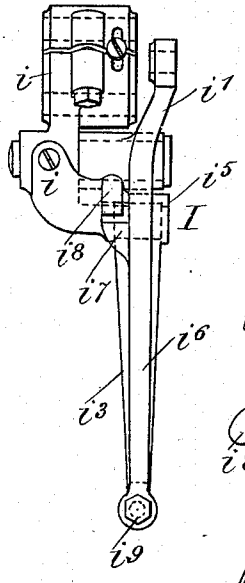


Fig. 7a

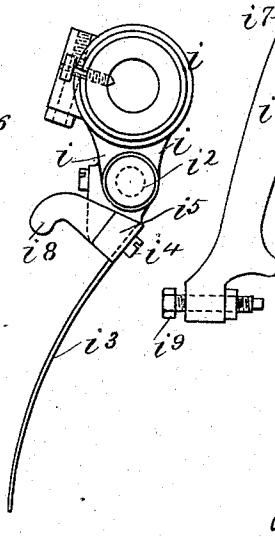
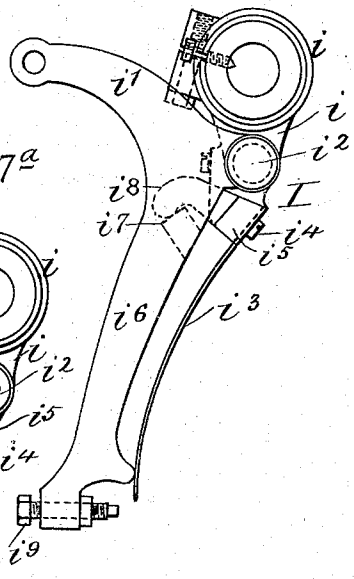


Fig. 7.



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E. WISEMAN.

STRAW BRAID SEWING MACHINE.

No. 565,585. Patented Aug. 11, 1896.

Fig. 8.

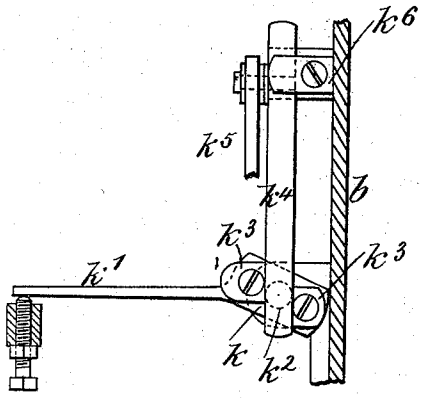


Fig. 9.

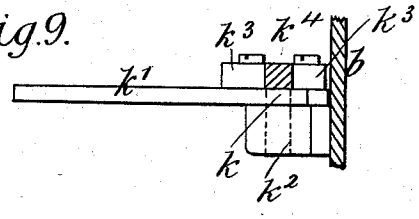
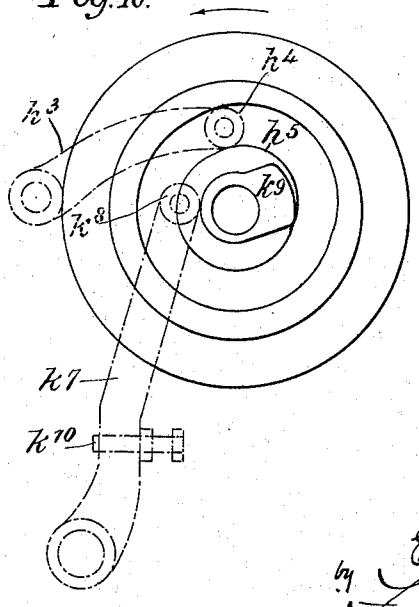


Fig. 10.



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E. WISEMAN.

STRAW BRAID SEWING MACHINE.

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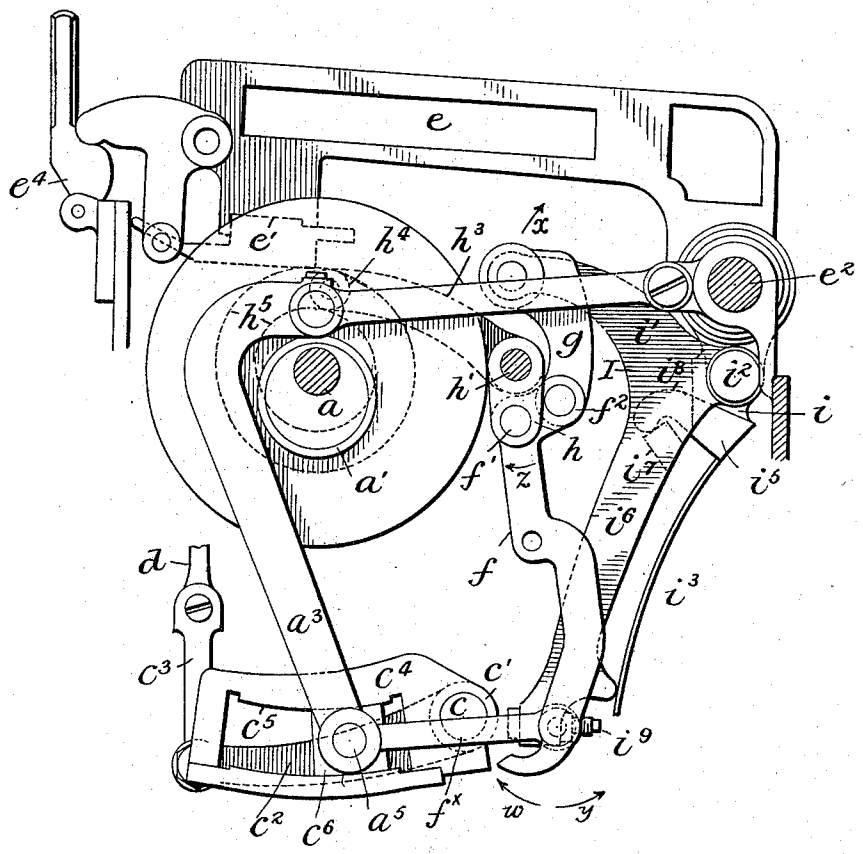
Fig. 11.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

EDMUND WISEMAN, OF LUTON, ENGLAND.

STRAW-BRAID-SEWING MACHINE.

SPECIFICATION forming part of Letters Patent No. 565,585, dated August 11, 1896.

Application filed August 31, 1895. Serial No. 561,150. (No model.)

To all whom it may concern:

Be it known that I, EDMUND WISEMAN, engineer, a subject of Her Majesty the Queen of Great Britain and Ireland, residing at Cheapside, Luton, in the county of Bedford, England, have invented certain Improvements in Straw-Braid-Sewing Machines, of which the following is a specification.

This invention relates to certain improvements in sewing-machines, having more particular relation to that class known as "straw-braid-sewing" machines and to other similar machines which are adapted to operate upon material which varies in thickness; and the invention consists in the novel construction, arrangement, and combination of parts, substantially as hereinafter more fully described.

In the accompanying drawings, forming a part of this specification, and in which like letters of reference indicate corresponding parts, Figure 1 is a plan view of the invention, those parts of the sewing mechanism not necessary to a clear understanding of the invention being omitted. Fig. 2 is a vertical sectional elevation on the line *x x* of Fig. 1. Figs. 3 and 4 are detail views of the controller-lever in front and side elevation, respectively. Fig. 5 is a detached view of the controller-lever rocker. Figs. 6 and 7 are similar views showing the spring-jointed lever in front and side elevation, respectively. Fig. 7ª is a detail side elevation of a part of the spring-jointed lever. Figs. 8 and 9 are respectively plan and front elevations of the devices for clamping the controller mechanism against movement. Fig. 10 is a face view of the controller-lever cam and the clamp-cam; and Fig. 11 is a detail side elevation of the controller mechanism, the clamping devices being omitted.

In the class of machines to which this invention relates the needles, usually provided near their ends with a hook, are thrust through the material from above or below the work-plate, carrying the thread in the form of a loop, and coöperate with one or more looping devices. In the operation of machines of this class it is essential that the needle at each stroke should pass through and project beyond the material for a sufficient distance to permit the loop to be engaged by the looping devices, and in order to accomplish this, when the material being operated upon is of varying thickness, it is necessary to automatically change the stroke or field of movement of the needle, that is to say, increase or lessen it accordingly as the material increases or diminishes in thickness. Various devices have been employed for effecting this result and in operation they have proved more or less successful, and usually such devices are operated by the rise and fall of the presser-arm, but as said presser-arm is constantly being slightly raised or lowered by the action of the feed devices the mechanism for controlling the throw of the needle is more or less affected thereby, resulting in the throw of the needle being constantly and unnecessarily changed. This is very undesirable, and it is one of the objects of my invention to neutralize the effect of this slight movement of the presser-arm upon the mechanism connecting the presser-arm and needle-operating devices, so that the throw of the needle will not be materially altered by such slight movement. Again in the passage of the needles through the work, especially if it be of a character to offer much resistance to such passage, it is often the case that the presser-foot is accidentally raised and the needle-operating mechanism affected in consequence, thus causing a variation in the throw of the needle. This is very objectionable, and it is another of the objects of this invention to overcome it by providing means, hereinafter described, for automatically locking the "controller mechanism"—that is, the mechanism connecting the presser-arm and needle-operating devices—during the passage of the needle through the work and for releasing such mechanism when the needle has completed its stroke.

Referring to the drawings, *a* is the main shaft of the machine, mounted in suitable bearings in the frame *b*.

c is the needle-carrier rock-shaft, supported in the bearings *c'*, and c^2 is an arm projecting from said shaft, near one end thereof, and connected, by means of a link c^3, with the needle-carrier *d*. To the other end of the rock-shaft *c* is rigidly secured the slotted arm c^4, in the slot c^5 of which a block c^6 is adapted

to move freely. Upon the main or driving shaft a of the machine is mounted an eccentric a', provided with the usual strap a^2. Pivotally connected at a^5 with the sliding block c^6 is a lever a^3, extending in position to be operated by the eccentric a'.

From the above it will be apparent that at each revolution of the main shaft a the lever a^3 and slotted arm c^4 will be lifted and the shaft c caused to rock. This movement of the shaft c lifts the arm c^2 and through link c^3 reciprocates the needle-carrier d. The length of the stroke of the needle, it will be noted, is determined by the position of the sliding block c^6 in the slot c^5 of the arm c^4, the nearer said block being to the rock-shaft c the longer the stroke of the needle.

The presser-arm e is provided with the usual presser-foot e', and is connected with the presser-arm rock-shaft e^2, in turn mounted in bearings e^3. The presser-arm is here shown as pivoted, but it will be understood that the ordinary reciprocating presser-bar may be employed instead, it being only necessary to connect such a bar to the rock-shaft e^2 by means of a lever.

Connected to the sliding block c^6 by means of a link $f^\times$ is the controller-lever f. The upper end of this lever is pivoted at f' with a rocker-arm h, secured upon a rock-shaft h' and adapted to move therewith. Rigidly secured upon the presser-arm rock-shaft e^2 is a spring-jointed two-part lever I, which will be described in detail hereinafter. This lever is connected, by means of a link g, with an arm f^2 of the controller-lever f, which is operated by the rise and fall of the presser-arm through the medium of the rock-shaft e^2, lever I, and link g, just described. Connected to the rock-shaft h' is an arm h^3, carrying a friction-roller h^4 at its end, which enters the groove in a controller-lever cam h^5 upon the main shaft a. From this it will be apparent that if the presser-arm be only slightly lifted by the action of the feed devices the presser-arm rock-shaft will be affected and the lever I lifted in the direction of the arrow x, Fig. 11, and through the medium of the link g will swing the lower end of the controller-lever f, which is pivotally supported upon the rocker h at f', in the direction of the arrow y. Simultaneously with this operation the controller-lever cam h^5 is rotated into position to lift the end of the arm h^3, causing the rock-shaft h' and rocker h to be rocked in the direction of the arrow z. This of course moves the controller-lever and changes the plane of its pivotal point, the effect of which is to move its lower end in the direction of the arrow w. It will thus be seen that two counteracting forces act simultaneously upon the controller-lever, each tending to move its lower extremity in the reverse direction to the other, the effect being naturally to keep the lower extremity of said lever f in substantially the same position, and consequently the position of the block c^6 in its slot is not materially altered and no appreciable change in the throw of the needle can result from the slight movement imparted to the controller mechanism by the action of the feed devices upon the presser-arm. If, however, the presser-arm is lifted or depressed to a greater extent than it could be by the feed devices, the movement of the controller-lever f upon its pivot f' is so much greater than that for which the shifting of the pivot f' can compensate that the lower end of the controller-lever is swung in either one direction or the other and through the link $f^\times$ alters the position of the sliding block or adjustable part c^6 and changes the throw of the needle, in the manner before explained.

During the passage of the needles through the work, if the work is of a character to offer resistance to the passage of the needles, there is danger of the presser-arm and controller mechanism being accidentally affected and the needles prevented from moving a proper distance for the loopers to engage the thread. To overcome all possibility of this, means are provided, termed "clamping means," for automatically locking the controller mechanism against movement during the passage of the needles through the work and for releasing said mechanism at the completion of each throw or stroke of the needle.

It will be obvious that various devices may be employed for effecting this, but I prefer to employ the simple form of clamping means which will now be described.

Pivoted to the controller-lever f (see Figs. 2, 8, and 9) is a link k^5, which in turn is pivoted to a slide k^4, supported in a suitable guide k^6. It is obvious from this that whenever the controller-lever is shifted the slide k^4, through the link k^5, is correspondingly affected, and it will be apparent, therefore, that if this slide is clamped so that it cannot move the controller-lever will not be permitted to move either. The devices for clamping the slide k^4 consist of a plate k, pivoted upon the frame b and provided with a spring extension or tail k'. Upon the plate k are two separated clamp-blocks k^3, between which the slide k^4 extends and is permitted to freely move when the plate k is in its normal position. The slight shifting of said plate to either side of its normal position will bring the clamp-blocks k^3 into contact with opposite sides of the slide k^4 and prevent the movement of said slide. The automatic shifting of the plate k is obtained by means of a pivoted lever k^7, the upper end of which carries a friction-roller k^8, which is in position to be engaged by what is termed a "clamp-cam" k^9, mounted upon the main shaft a. This cam is so formed and adjusted that, during each rotation of the shaft a or during the passage of the needle through the work, it will throw an adjusting-screw k^{10} of the lever k^7 into contact with the extension or tail k'

of the plate k, causing the said extension and consequently the plate k to be shifted to clamp the slide k^4.

It will be readily understood that clamping means for locking the controller mechanism may be dispensed with entirely, but I prefer to employ some form of clamping means, as it renders the action of the machine more certain and reliable.

The controller mechanism is operated positively in both directions, and when the controller-lever f is locked against movement, and the presser-arm is raised, as, for instance, to remove or insert the work, it is necessary that some part of the remaining devices of the controller mechanism should give or yield to compensate for the failure of the controller-lever to move. Various means may be employed for this purpose, and such means may be located at different points accordingly, as convenience demands. In the present instance this function is performed by the spring-jointed or two-part lever I, hereinbefore referred to. This lever is formed in two parts $i\,i'$, the part i being fixed upon the rock-shaft e^2 and adapted to move therewith. The part i' is pivoted at i^2 to the lever i and is provided with a dependent arm i^6, carrying a lug or stop i^7, which is normally held in contact with a stop i^8 on the part i by means of a spring i^3. This spring is secured to a lateral projection i^5 of the part i and bears upon the lower end of the dependent arm i^6, and said spring is sufficiently strong to hold the stops $i^7\,i^8$ in contact, and consequently the two parts $i\,i'$ normally move as one. When, however, the presser-bar is lifted, as, for instance, by the lift-handle e^4, while the controller-lever f is locked, the part i', which is connected to the controller-lever f by the link g, is caused to turn upon its pivot i^2 by reason of the failure of the arm f^2 to move. This causes the spring i^3 to yield and results in the separation of the stops $i^7\,i^8$, which are again moved into contact by the action of the spring when the presser-bar is lowered. The necessary upward movement of the presser-bar to give the highest throw to the needles is usually very much less than that required to insert or withdraw the work, and it is desirable that the needle-operating mechanism be not affected by the movement of the presser-bar above a predetermined point. This is accomplished by the two-part lever I just described by providing the lower end of the dependent arm i^6 of the part i' with an adjustable stop i^9, adapted to make contact with a stationary bearing c' when the sliding block c^6 is at the end of the slot c^5 nearest the rock-shaft c, or, in other words, when the parts are adjusted to a position to give to the needles their highest throw. It will thus be apparent that if the presser-arm e be raised after the stop i^9 makes contact with the bearing c' the effect will be to hold the part i' stationary, and as the part i must of necessity move with the presser-arm rock-shaft e^2 the stops $i^7\,i^8$ will be separated against the action of the spring i^3.

Without limiting myself to the precise construction and arrangement of parts shown and described, what I claim is—

1. In a sewing-machine, the combination with the needle-operating mechanism, of the presser-arm, pivoted controller-lever, connections between the controller-lever and needle-operating mechanism, connections intermediate the controller-lever and presser-arm said controller mechanism being operated positively in both directions by the elevation and depression of the presser-arm, whereby the former is swung upon its pivot by the movement of the latter, and means for automatically shifting the position of the pivotal point of the controller-lever during its swinging movement to neutralize the effect of such movement upon the needle-operating mechanism, substantially as described.

2. In a sewing-machine, the combination with the needle-operating mechanism, of a presser-arm, controller mechanism intermediate the presser-arm and needle-operating mechanism whereby the movement of the latter is controlled by that of the former, said controller mechanism embracing a two-part lever provided with a yielding connection between its parts and with a stop adapted to make contact with a stationary bearing upon the lever being moved a predetermined distance, substantially as described.

3. In a sewing-machine, the combination with the needle-operating mechanism, of a presser-arm, controller mechanism intermediate the presser-arm and needle-operating mechanism whereby the movement of the latter is controlled by that of the former, said controller mechanism embracing a controller-lever and a two-part lever provided with a yielding connection between its parts, and means for automatically locking the controller mechanism against movement during the passage of the needle through the work, substantially as described.

4. In a sewing-machine, the combination with the needle-operating mechanism, of a presser-arm, controller mechanism intermediate the presser-arm and needle-operating mechanism whereby the movement of the latter is controlled by that of the former, locking mechanism comprising a rotatable plate carrying separated clamping-blocks, a connection intermediate the controller mechanism and locking mechanism, extending between the said clamping-blocks, and means for automatically turning the plate, substantially as described.

5. In a sewing-machine the combination with the needle-operating mechanism, of a presser-arm, controller mechanism intermediate the presser-arm and needle-operating mechanism, whereby the movement of the latter is controlled by that of the former, said controller-lever embracing a two-part lever,

the parts of which are pivotally connected and provided with stops, a spring for holding said stops normally in contact and means for automatically locking the controller mechanism against movement during the passage of the needle through the work, substantially as described.

6. In a sewing-machine, the combination with the driving-shaft, a cam h^5 thereon, of the needle-operating mechanism, the presser-arm, pivoted controller-lever f, connections between the controller-lever and the presser-arm, whereby the former is swung upon its pivot by the movement of the latter, a rock-shaft h' having an arm h to which the controller-lever is pivoted and an arm h^3 extending from said rock-shaft into engagement with the cam upon the rock-shaft, substantially as described.

7. In a sewing-machine, the combination with the needle-operating mechanism having an adjustable part, of a presser-arm, pivoted controller-lever f, connections between the controller-lever and the adjustable part of the needle-operating mechanism, a lever I connected to the presser-arm and a link g connecting said lever with the controller-lever whereby the latter is positively swung upon its pivot by the movement of the presser-arm, substantially as described.

8. In a sewing-machine, the combination with the needle-operating mechanism, of a presser-arm, controller mechanism intermediate the presser-arm and needle-operating mechanism, said controller mechanism embracing a pivoted controller-lever, a rotatable plate carrying separated clamping-blocks and provided with an extension, a slide extending between said blocks, a link connecting the slide and controller-lever, a driving-shaft, a cam mounted thereon and a lever actuated by said cam and adapted to make contact with the extension of the rotatable plate, substantially as described.

9. In a sewing-machine, the combination with the needle-operating mechanism and the presser-arm, of controller mechanism intermediate the presser-arm and the needle-operating mechanism whereby the movement of the latter is controlled by that of the former, said controller mechanism being operated positively in both directions by the elevation and depression of the presser-arm, and means for imparting a counteracting movement to the controller mechanism in such manner as to neutralize the effect upon the needle-operating mechanism of the slight movement of the controller mechanism due to the action of the feed devices upon the presser-arm, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 20th day of August, 1895.

EDMUND WISEMAN.

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