

(No Model.)

3 Sheets—Sheet 2.

T. J. HOLTON & F. MALSCH.
SEWING MACHINE.

No. 570,479.

Patented Nov. 3, 1896.

Fig. 2.

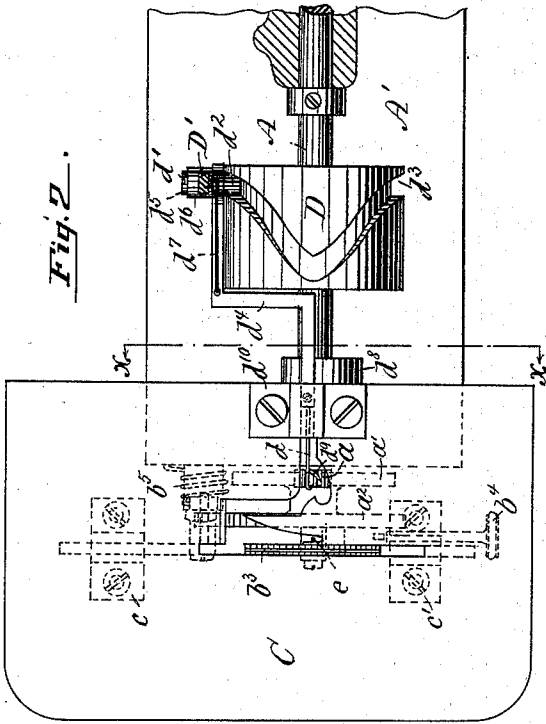


Fig. 3.

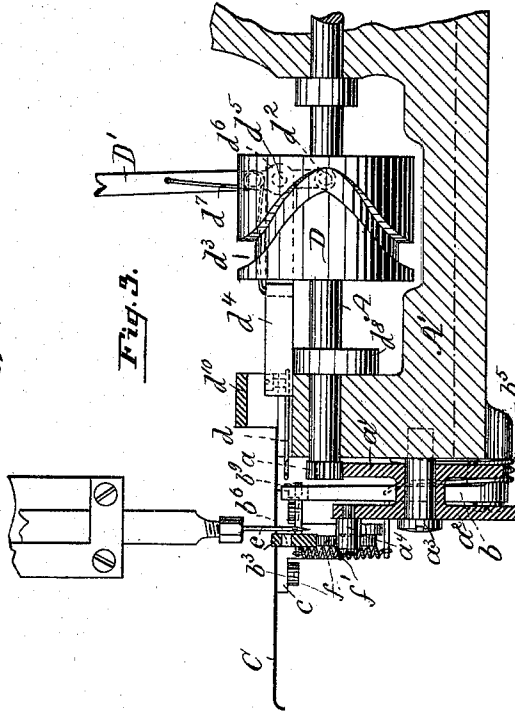


Fig. 5.

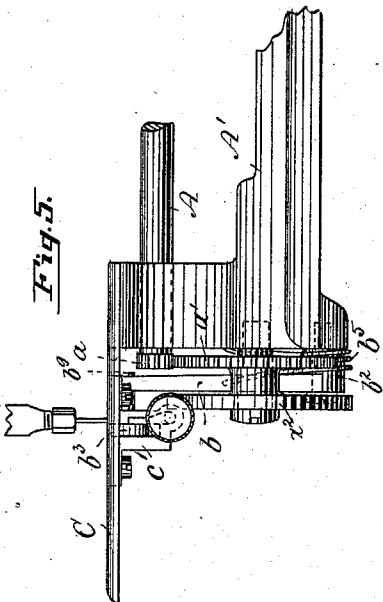
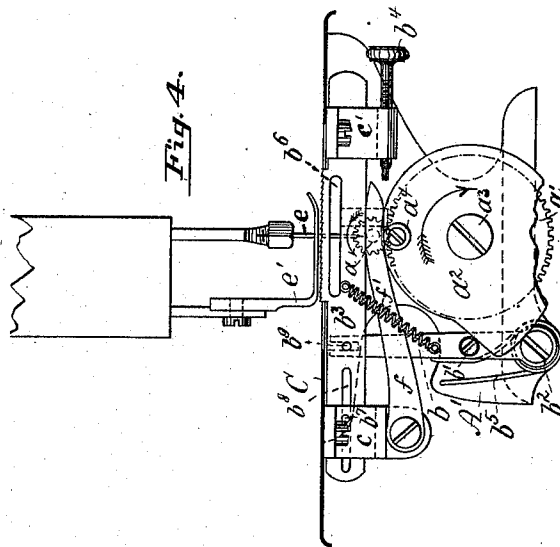


Fig. 4.



WITNESSES:

Herman Bornmann.
Geo. Shoemaker

INVENTORS:

Thos. J. Holton
Frank Malsch.

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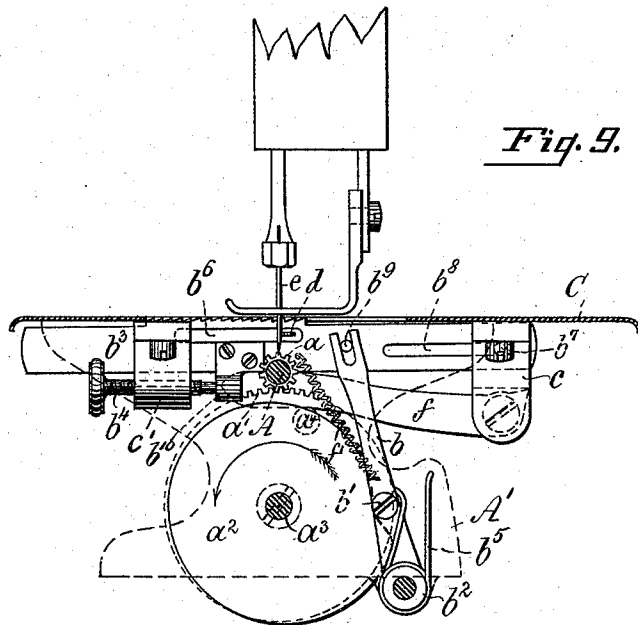
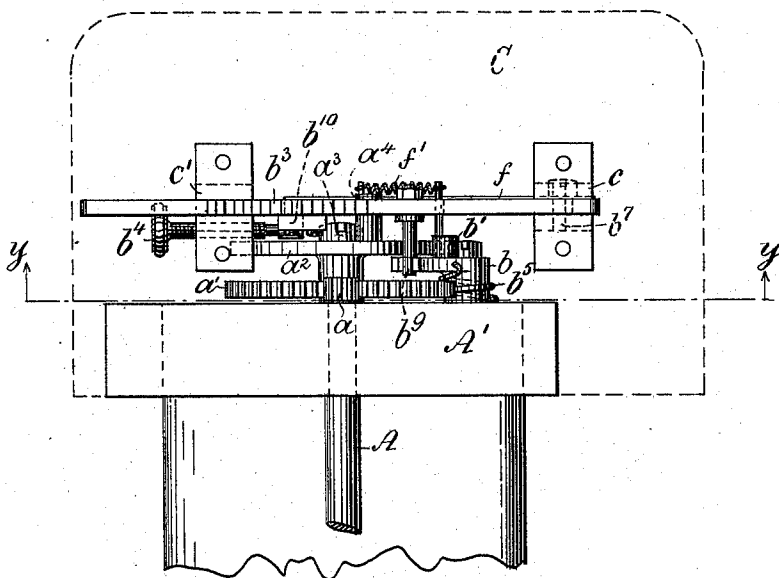


Fig. 9.

Fig. 10.



WITNESSES:

Hermann Bormann
Joseph Gross

INVENTORS:

Thos. J. Holton
Frank Malsch
by *John Schmalzer atty.*

UNITED STATES PATENT OFFICE.

THOMAS J. HOLTON AND FRANK MALSCH, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNORS TO JOHN SHOEMAKER AND THOMAS J. HOLTON, OF SAME PLACE.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 570,479, dated November 3, 1896.

Application filed September 3, 1838. Serial No. 234,455. (No model.)

To all whom it may concern:

Be it known that we, THOMAS J. HOLTON and FRANK MALSCH, citizens of the United States, residing in the city and county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Crochet-Machines, of which the following is a specification.

This invention relates to that class of machines principally used for crocheting or over-stitching the edges of knit or other fabrics, and more particularly to the kind which are adapted to forming on the edge of the fabric an ornamented border having scallops or undulations and known as "shell-stitch" machines. In this class of machines there were heretofore certain practical difficulties in the way of their successful use for the purpose intended. What these difficulties were and the manner in which they have been overcome will be clearly shown in the description of the construction and operation of our improvements.

The invention consists in the novel construction and combination of parts of a crochet-machine, as will be hereinafter fully described and claimed.

The following description will enable those skilled in the art to make and use our invention.

In the drawings, Figure 1 is a rear side elevation in perspective, showing the feed mechanism, and also the hanging arm to which is hinged the horizontal needle-bar containing the latch-needle. Fig. 2 is a plan showing the cams for imparting motion to the crochet-needle, and also portions of the feed mechanism. Fig. 3 is a partial view in longitudinal elevation. Fig. 4 is a front elevation. Fig. 5 is a partial view in side elevation. Fig. 6 is a detail view showing the horizontal needle-raising cam on the line *xx* in Fig. 2. Fig. 7 is a detail view showing the feed-cam. Fig. 8 is a view showing the fabric with a border produced by our machine. Fig. 9 is a sectional end view on the line *yy* of Fig. 10, showing the regulating device for the feed-bar and feed-moving mechanism; and Fig. 10 is a plan view thereof.

Like letters refer to like parts in all the drawings.

The feeding devices are shown fully in Figs. 1, 2, 3, 4, 5, and 7.

On the front end of the driving-shaft *A* is a small pinion *a*, which meshes with a larger gear *a'*, secured to which is a cam *a*², both being capable of a rotary movement on the supporting-stud *a*³. Just back of this cam *a*² and hinged to the machine-frame *A'* is the feed-lever *b*, having a roller *b'* engaged with the cam *a*² a short distance above the fulcrum *b*². At each complete revolution of the cam this lever *b* imparts to the feed-bar *b*³ one forward and backward movement, the length of which may be controlled by the thumb-screw *b*⁴ in the following manner: To the feed-bar *b*³ is secured a bracket or projection *b*⁵, which, when the bar *b*³, by the action of the spring *b*⁶ on the lever *b*, makes its backward movement, will impinge against the thumb-screw *b*⁴. This screw is regulated and set by hand to limit the backward movement of the feed-bar *b*³, while its forward movement is limited by the roller *b'* of the lever *b* gliding on the periphery of the cam *a*², as will be readily understood by reference to Figs. 2, 4, 9, and 10.

An expansion-spring *b*⁵ is coiled around the lower part or stem of the lever *b*, for the purpose of keeping the roll *b'* in contact with the cam *a*² when the feed-bar *b*³ is making its movement. The feed-bar *b*³ rests in the slotted guides *c* and *c'* beneath the plate *C*. Midway of its length will be found a slot *b*⁶, which enables the crochet-needle *d* to pass in and out while taking the loop from the vertical needle *e* beneath the plate *C* without striking the feed *b*³. The rear end of the feed-bar *b*³ is also slotted, and is held in position by a pin *b*⁷ passing through the guide and slot *b*⁸. Between the two slots on the feed-bar is located the pin *b*⁹, which secures the bar *b*³ to the feed-lever *b*, forked for its reception and movement. Hinged to the rear guide *c* is the feed-raising lever *f*, on which the feed-bar *b*³ rests, and which receives its upward motion from a roll *a*⁴, secured to the face of the cam *a*². The spiral spring *f'* in-

sure contact between the feed-bar b^3 , raising lever f and cam-roll a^1 during the passage of the roll a^1 , which elevates the feed-bar b^3 to its full height during its forward movement.

5 It will be observed that the feed movement just described is designed to make one forward movement of the fabric at each seventh stitch, the pinion a and gear-wheel a' being as one to seven; but this proportion may be
10 varied at pleasure by the substitution of suitable gearing, or the cam a^2 may be made to give several forward thrusts during its revolution instead of one. Some of those thrusts may be long, while others are short, thereby
15 securing varied effects which are sometimes required for ornamental stitches; but in making what is commonly known as the "shell" stitch the usual plan is to combine with an ordinary crochet-machine a feeding device
20 adapted to moving the goods forward about one inch while the vertical needle is raised and about descending for the seventh stitch; thus seven crochet-stitches are taken while the fabric remains stationary. The effect of
25 moving the goods rapidly forward and taking seven more stitches in one spot is to spread the stitches out as radiating from a center, as shown in Fig. 8, thereby forming a scallop or series of scallops or undulations, when the
30 operation is continued. Now, it is a matter of importance to regulate the distance apart of each scallop, so that when a heavy thread is used for ornamenting it may not be crowded
35 into a narrow space, which would destroy the symmetrical appearance of the figure, or if, on the other hand, a fine thread is used it should not be made to cover a space to which its dimensions would render it inadequate; but so far as we are aware this important
40 point has been overlooked in the machines in common use for this purpose, as no provision has been made for regulating the distance between each series of stitches. This difficulty is fully overcome in our machine, as the
45 length of the movement of the feed-bar can be regulated to any desired length by the thumb-screw b^4 , as heretofore described. Another advantage of this feed mechanism is its great durability, as the feed-moving cam a^2
50 makes but one complete revolution while the needle e makes seven stitches. The wear does not amount to a tithe as compared with those machines now in use.

The operation of the machine is as follows:
55 The fabric to be ornamented is placed under the presser-foot e' , and, the vertical needle e being threaded, the driving-pulley N is revolved in the direction of the arrows. The ver-

tical needle e then descends through the work down to the lowest point. It then begins to
60 rise, and in doing so throws out a loop of thread which is grasped by the hook of the crochet-needle d , which recedes to the position shown in Fig. 3. It is then lifted over
65 the plate by the action of the needle-raising cam d^1 , and as it reaches its highest point it advances over the presser-foot e' to a point just back of the needle e . In the meantime
70 the loop taken below the plate C is forced over the latch d^9 of the needle d . The hook then grasps the thread above the presser-foot e' and recedes, at the same time descending and pulling the thread through the loop from
75 below. This operation is repeated for six stitches without any action of the feed b^3 on the fabric, but on the rise of the vertical needle e to complete the seventh stitch the feed
80 rises up and carries the fabric forward the required distance, which usually approximates one inch; but to obtain the best result it is advisable to adjust the stroke of the
85 feed-bar b^3 to the character of the fabric and to the size and quality of the thread being used. This can readily be done by means of the thumb-screw b^4 . (Shown in Figs. 1, 2, 3, 4, and 5.)

Devices for making the scallop or shell pattern on crochet-machines are not new; we therefore make no claim, broadly, to such device.
90

Having thus fully described our invention and the best manner in which it may be carried into effect, what we claim, and desire to secure by Letters Patent, is—

1. The combination in a crochet-machine
95 of the stitching-needle, the latch-needle, the presser-foot, the feed-bar having a longitudinal slot for the passage of the latch-needle, the feed-lever, the spiral feed-cam, the gear-wheel and pinion and a device for regulating
100 the length of stroke of the feed-bar substantially as described and set forth.

2. The combination in a crochet-machine, of a stitching-needle, the vertically-movable and longitudinally-reciprocating latch-needle, the presser-foot, the feed-bar provided
105 with a longitudinal slot through which the latch-needle is adapted to reciprocate, the feed-lever, the spiral feed-cam, the pinion and the gear-wheel, substantially as described.
110

THOS. J. HOLTON.
FRANK MALSCH.

Witnesses:

BENTON O. SEVERN,
GEO. W. ROYAL.