Jan. 14, 1936. C. W. SCHWEIGER 2,028,016

SEWING MACHINE

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Fig.1

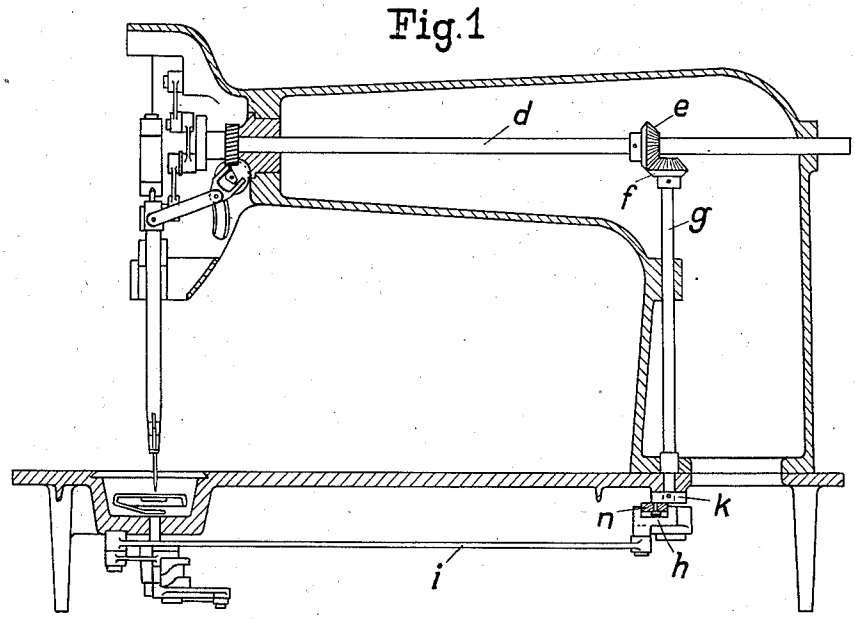


Fig.2

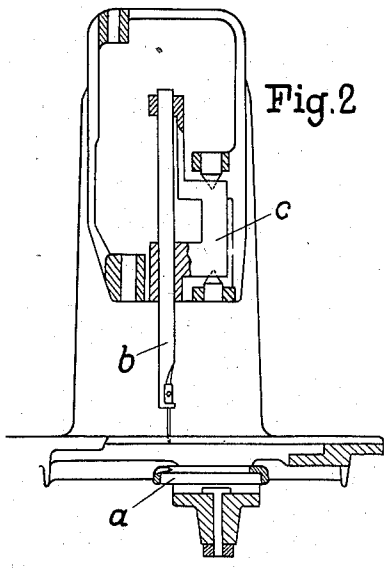
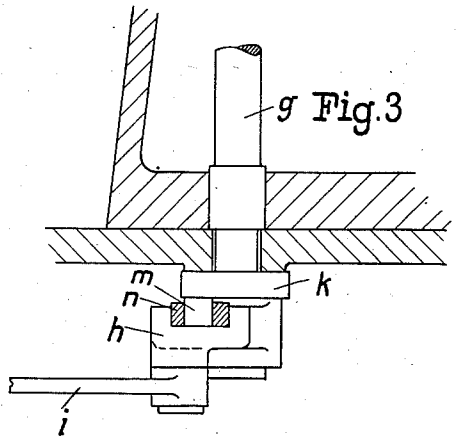


Fig.3



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Fig.4

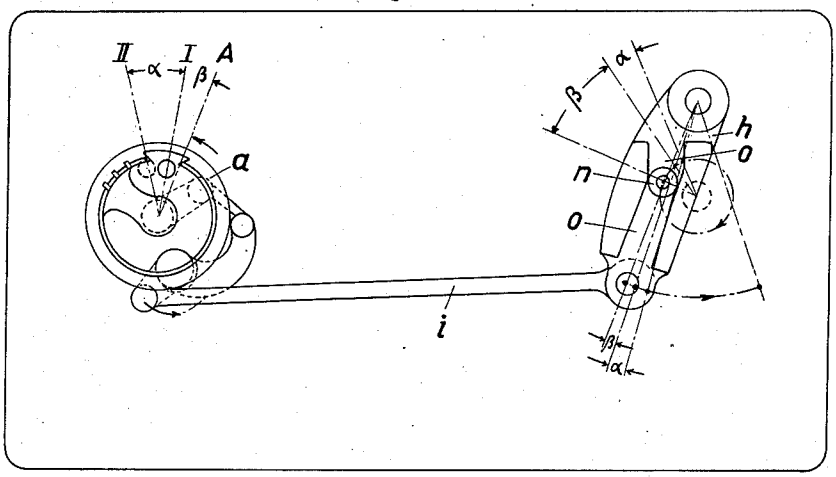


Fig.5

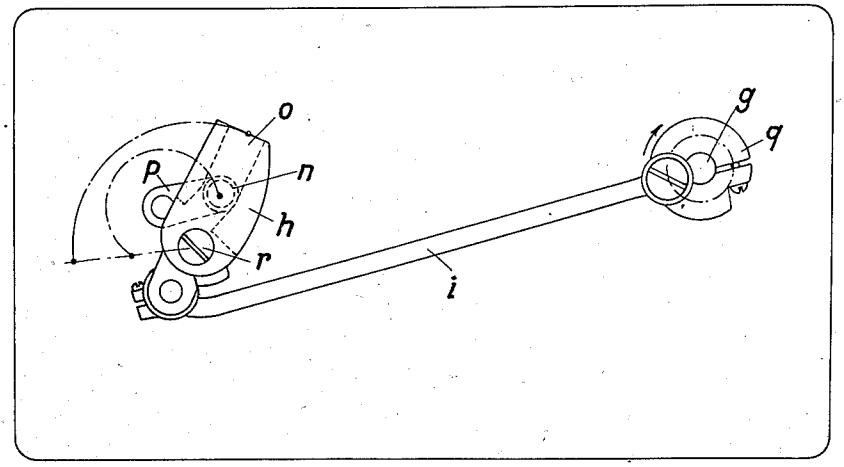
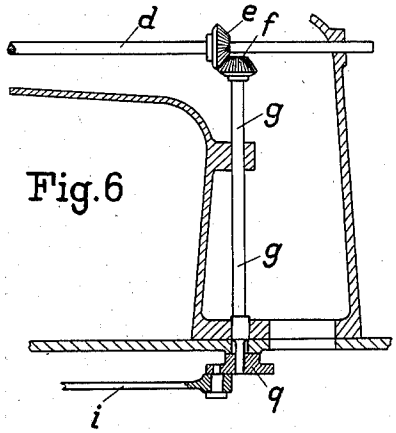


Fig.6



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UNITED STATES PATENT OFFICE

2,028,016

SEWING MACHINE

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Application November 28, 1934, Serial No. 755,103
In Germany September 19, 1933

1 Claim. (Cl. 112—159)

This invention relates to a combination trimming and zigzag sewing machine having a looper moved in a horizontal plane and a needle bar oscillatable parallel thereto, in which the looper shaft and the axis of the swinging frame of the needle bar are coaxial to insure a distance between the needle and the point of the looper, which will not vary at all working widths.

A construction has been proposed already, in which the looper is disposed in front of the needle to facilitate the exchange of the bobbin and the needle pierces outside the path of the looper point. This arrangement is, however, open to the objection that the needle has to be threaded from the rear towards the front, i. e., oppositely to the direction of sewing, which is not only inconvenient but interferes also with the normal course of the thread, as the needle thread has to carry out a complete turn about the needle at each stitch.

It is further known to provide regular trimming machines with a horizontally moved looper, so that the needle pierces within the path of the looper point. In this construction, however, the looper is disposed laterally near the needle which has thus to be threaded transversely to the usual direction of sewing, whereby the undesirable so-called herringbone stitch is produced. Moreover, this construction cannot be used in connection with zigzag sewing machines having a needle oscillating transversely to the direction of sewing.

Compared with these constructions, the invention consists in employing a looper coaxial with the axis of the needle bar moving transversely to the direction of sewing and such a looper, in which the needle pierces within the path of the looper point and this looper is arranged in front of the needle. In this way a domestic and zigzag sewing machine is provided which, during zigzag sewing, does not only insure a never varying distance of the needle from the looper point, but, in straight sewing, will always produce an accurate straight seam under the most favorable conditions for looping. This latter feature has hitherto been attained only by means of ring loopers moving in a vertical plane and of vibrating shuttle systems, both of which are, however, not suited for combination trimming and zigzag sewing machines of the kind covered by this application.

To adapt also the vertical distance of the looper point from the needle eye to the required extent to the various positions of the needle in zigzag sewing so as to always insure safe catching of the needle thread loop, the looper is driven from the main shaft of the machine by means of a special oscillating crank gear which makes it possible to impart a temporarily increased speed to the looper point when passing through the two needle piercing positions. Similar means have been used already in sewing machines having a vertically rotating looper. The employment of such an oscillating crank gear in zigzag sewing machines with a horizontally moved looper, according to the invention, affords an opportunity of considerably simplifying the looper drive, so that the safety in operating the machine is increased and wear reduced.

By way of example, the invention is illustrated in the accompanying drawings, in which

Fig. 1 is a longitudinal section of the machine;

Fig. 2, a side view thereof, partly in section;

Fig. 3, a detail view on an enlarged scale;

Fig. 4, a top view of the driving mechanisms for the looper;

Fig. 5, a view of another form of looper drive, and

Fig. 6, a longitudinal section of the standard of the sewing machine top with a looper drive as shown in Fig. 5.

Referring to the drawings, the horizontally moving looper *a* is arranged in the extension of the axis of the swinging frame *c* of the needle bar in front of the needle bar *b* and so constructed that it will catch the thread loop behind the needle. This construction affords not only the advantage that at each piercing position during zigzag sewing the needle has the same distance from the looper axis, but makes it possible also conveniently to remove upwardly the lower thread bobbin from the bobbin casing in front of the needle bar or to insert it therein from above. Furthermore, another essential advantage is that the bobbin thread is threaded from the front towards the rear, i. e. in sewing direction, so that during sewing of a straight seam an accurate pearl stitch will result. The oscillating motion of the looper *a* at varying speeds is effected from the main shaft *d* by means of a simple bevel gear *e*, *f*, a vertically disposed shaft *g*, an oscillating crank gear *h* of known type, and a connecting rod *i* articulated thereto. In the construction shown in Figs. 1 to 4 the shaft *g* carries for this purpose at its lower end a crank disc *k* with a crank pin *m* and a roll *n* rotatable on the latter and moving

during rotation of the crank disc *k* in a slide *o* of the oscillating crank gear *h*. In order to attain in zigzag sewing, even for largest working widths, in both piercing positions of the needle a vertical distance of the looper point from the needle eye sufficient for safely catching the thread loop, the slide *o* of the member *h* is constructed so that the motion of the looper point from the initial position A, Fig. 4, through the angle β to the first constant piercing position I is slow, but accelerated from the latter position through the angle α, which is variable to permit different working widths, to the second piercing position II, and accelerated the more the larger the angle α is, i. e. the greater the distance from the second piercing position II to the first piercing position I. This is attained, for instance, by causing the slide *o*, extending from the hinge point of the member *h* with the rod *i* in the direction of the fulcrum, to deviate after the completion of the looper motion from the initial position A to the first needle piercing position I in an angular or curved manner so that the end point of the slide *o* will be removed from the circle of the crank pin *m*, as indicated in Fig. 4.

In this construction of the looper drive the motion of all rotating driving shafts is uniform to prevent one-sided wear of the shafts and their bearings.

In the type of looper drive shown in Figs. 5 and 6 the oscillating crank gear *h* is in direct engagement with the looper itself or with its fixed crank arm *p* and moved about a pivot *r* by the connecting rod *i* which is uniformly reciprocated from the shaft *g* by means of the simple crank *q*. This construction affords the advantage that all driving parts including the connecting rod *i* are moved uniformly and the necessary irregularly accelerated motion is imparted only to the looper. In this way steadier running of the machine is produced and the possibilities of wear with respect to the looper drive are further reduced.

What I claim, is:

In a combination trimming and zigzag sewing machine with a ring looper oscillating in the horizontal plane, a needle bar moving transversely to the sewing direction in zigzag work, a swinging frame for said needle bar, and a looper disposed in front of the needle and being coaxial with said swinging frame, the point of said looper engaging the needle thread loop behind the needle.

CURT WILHELM SCHWEIGER.