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SEWING MACHINE PRESSER FOOT MECHANISM

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FIG. 1

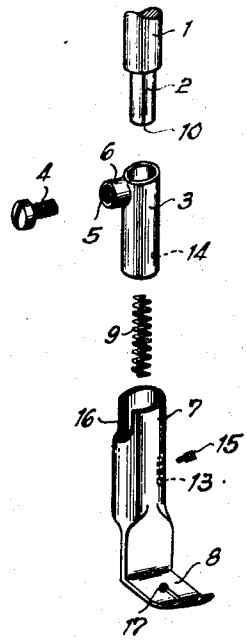
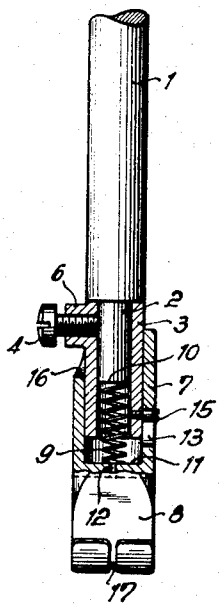


FIG. 2



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SEWING MACHINE PRESSER FOOT MECHANISM

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2 Claims. (Cl. 112—235)

This invention relates to sewing machines, of the kind which include top feed means. An object of the invention is to provide a top feed foot which is particularly suitable for sewing plastic materials, silks and fur-like material.

In sewing machines, provided with top feed means, a presser foot and a top feed foot co-operate to apply pressure to the material alternately. The method of operation is that the foot which is pressed on to the material acts as a support for lifting the other of the two feet. In order that the feeding operation can be carried out accurately, it is important to see that the said support is always provided at the correct time. These considerations have given rise to various proposals for overcoming frictional resistance more efficiently and for reducing inertia, since these effects are liable to affect the time at which the aforesaid support is required. It has therefore been proposed that the top feed bar should be provided with spring means, the machine housing serving as the abutment for the spring. The spring forces, namely those on the top feed bar and those of the presser foot bar, come into action alternately or jointly on their respective feet.

The arrangement of such springs merely produces the pressure which is necessary to prevent jamming and to reduce inertia. This pressure must be increased in proportion to the operating speed of the sewing machine. In the case of high-speed machines a strong pressure of this kind, especially on the top feed foot has an almost hammer-like effect seeing that it is free during its downward stroke. The part being sewn is hammered and stretched, which in the case of delicate materials such as poplins, causes the stitched part to be glazed and corrugated.

When sewing material with raised portions such as transverse seams, it has hitherto been preferred to use machines with a longer stroke for the feed foot than when sewing similar material without transverse seams. But in this case, when the foot is carrying out its return movement it looses contact with that part of the material which is of normal height. This is particularly disadvantageous in sewing silks, synthetic materials, fur-like material and the like, which, to a very high degree, tend to rise upwards and to slip slightly thus causing crooked seams and untrue stitches.

An object of the invention is to overcome the aforesaid disadvantages and to make it possible to sew delicate material without damaging same, and at the same time to produce straight seams.

The invention consists in a sewing machine having a top feed foot slidably mounted on a top feed bar by means of a sleeve arranged on the said bar, said foot being elastically supported against the said bar by means permitting relative motion between the said bar and the said foot in the direction of application of pressure to said foot.

In a preferred embodiment the extent of the relative

motion between the bar and the foot is limited by abutments in both directions. The foot can be mounted in various ways. The holding sleeve is expediently arranged to be slidable in the foot and a compression spring is provided between the foot and the feed bar.

One embodiment of a top feed foot in accordance with the invention is illustrated in the accompanying drawings, in which:

Figure 1 is an exploded view of the top feet foot and a part of the top feed bar, in perspective,

Figure 2 is a front view, partly in section, of the top feed foot fixed to the top feed bar.

The top feed bar **1** terminates in a stud portion **2** on to which a sleeve **3** is fitted and fixed by means of a screw **4**. For this purpose the sleeve **3** is provided with a boss **6** formed with a screwthread **5**.

The sleeve **3** is mounted so as to be capable of longitudinal displacement in the tubular upper part **7** of the top feed foot **8**, which is not toothed. Situated in the sleeve **3** is a spring **9**, one end of which bears on the end face **10** of the stud **2** of the top feed bar **1** and the other end of which engages with the end of the tubular part **7** which is bent inwardly to form a transverse wall **11**. To enable the air pressure inside the tubular part to remain the same as outside, the transverse wall **11** is provided with a hole **12** through which air can escape. Provided in the tubular part **7** of the top feed foot **8** is a longitudinal slot **13** in which the head of a setscrew **15**, screwed into a hole **14** in the sleeve **3**, is slidable. The ends of the slot **13** form abutments for the head of the screw **15**, thus limiting the length of stroke of the foot **8** with respect to the bar **1**. In order to prevent the foot **8** from being turned relative to the bar **1**, the projection **6** on the sleeve **3** is guided in a recess **16** in the tubular part **7**. The foot **8** is provided in the usual manner with a hole **17** for the machine needle (not shown).

The embodiment described above operates as follows:

The top feed foot **8** is so arranged on the top feed bar **1** that, when a single layer of material is being sewn, the said foot is only a very short distance above the material when in the raised position. The parts are then in the position shown in Figure 2 with respect to one another. When the parts are in this position, the spring **9** presses the foot **8** downwards until the setscrew **15** abuts against the top end of the guide slot **13**. Thus practically no free space is left between the foot **8** and the material being sewn.

Where there are several layers of material, in the case of transverse seams, or hems and the like, the pressure of the spring **9** maintains the foot in contact with the material even when the bar is raised. This pre-loading is provided during the whole return motion of the foot **8**, and has the special sewing effect which was mentioned initially. Whilst the presser foot holds the material fast behind the needle, the top feed foot **8** smooths the material in the direction opposite to the feed direction during its return motion. Owing to the pre-loading and the gradual pressure increase when the foot **8** travels downwards, overcoming the force of the spring **9**, the foot cannot exert any hammering effect on the material.

By suitable choice of the strength of the spring **9** and by suitable adjustment of the extent of the relative motion permitted between the top feed foot slot **8** and the bar **1**, it is possible to adjust the pressure development, and the time when maximum pressure is exerted, within certain limits, so as to guarantee the most advantageous feed conditions for each type of material and for each thickness of material.

What we claim as our invention and desire to secure by Letters Patent of the United States is:

1. In a sewing machine having a presser bar and a

top feed presser foot supported endwise of said presser bar, means supporting said presser foot elastically and slidably on said presser bar, said means including a sleeve rigidly secured to the bottom of said bar, a tubular shaft on said presser foot in sliding engagement with said sleeve, a slot extending longitudinally of said shaft, a stroke limiting member secured in said sleeve and extending into said slot, a shoulder defined at the lower end of said tubular shaft and resilient means extending between said shoulder and the lower end of said bar.

2. In a sewing machine having a presser bar and a top feed presser foot supported endwise of said presser bar, means supporting said presser foot elastically and slidably on said presser bar, said means including a sleeve rigidly secured to the bottom of said bar, a tubular shaft on said presser foot in sliding engagement with said sleeve, a slot extending longitudinally of said shaft, a

stroke limiting member secured in said sleeve and extending into said slot, a shoulder defined at the lower end of said tubular shaft and resilient means extending between said shoulder and the lower end of said bar, the lower end of said presser bar defining a stud, said sleeve presenting a radially extending boss at its upper end having a threaded aperture, a set screw in said aperture securing said sleeve on said stud and said tubular shaft having a recess at its upper open end extending laterally of said boss.

References Cited in the file of this patent

UNITED STATES PATENTS

1,487,419	Witkus	Mar. 18, 1924
1,880,749	Bowman	Oct. 4, 1932