To all whom it may concern:

Be it known that I, ISIDORE LEON MILLER, a citizen of the United States, and a resident of Manhattan, in the county of New York, and State of New York, have invented certain new and useful Improvements in Needle-Guards for Machines for Sewing, Embroidering, &c., of which the following is a specification.

This invention relates to a needle-guard for machines for sewing, embroidering, etc., and the main object of the invention is to provide a safety device which will at all times during the operation of the machine mask the needle at the point where the operator locates the work and thus prevent injury to the operator.

In carrying my invention into effect I employ a needle-guard that surrounds the needle in the danger zone and has a suitable relative movement with respect to the needle and needle-bar when the machine is in operation. Preferably the guard is an extensible device, the usual construction being one in which the guard comprises a series of tubular telescopic sections connected at their upper end to the needle-bar and resting at their lower end on the uppermost plate through which the needle passes. The construction is such that as the needle-bar rises the guard will automatically be extended and as the needle-bar descends the guard will be automatically shortened, the lower end of the guard preferably remaining at all times in contact with the aforesaid plate.

Other features of the invention not hereinafter referred to will be hereinafter described and claimed and are illustrated in the accompanying drawing in which—

Figure 1 is an elevation of so much of a sewing machine head of well-known construction as is necessary for coaction with my improved needle-guard;

Fig. 2 is an enlarged detail of a portion of the same illustrating in vertical section and elevation the extended position of the needle-guard, and

Fig. 3 is a similar view showing the needle-guard contracted when the needle-bar and the needle are down.

Similar characters designate like parts in all the figures of the drawings.

My improved needle-guard may be applied to any suitable type of machine for sewing, embroidering, etc., and in the embodiment illustrated is shown in connection with the well-known Singer type of sewing machine. In the embodiment illustrated 2 designates the forward end of the head of the sewing machine in which is mounted the usual needle-bar, 3, which, it will be understood, is intended to be operated in the ordinary manner by the mechanism commonly employed in such machine (not shown). At its lower end this needle-bar is reduced, as 65 is usual, and has the usual longitudinal groove in its face for receiving the head of the needle, 4, to be clamped. To the lower end of the needle-bar there is shown secured the usual detachable foot and thread-guide, 6, through which the needle-thread passes. A clamp of any usual or suitable construction is shown at 7 as detachably secured to the reduced lower end of the needle-bar, it having a suitable clamp-screw, 8, by means of which it may be secured in place and released at will. This clamp is intended in the preferred construction to carry the needle-guard before described.

My improved needle-guard, as before stated, is intended to surround the needle in the danger zone and is preferably coaxial therewith and so combined with the adjacent parts as to have a relative movement in the direction of travel of the needle. The preferred construction is one in which the lower end of the device is substantially immovable with respect to the plate 9 through which the needle passes, but has at its upper end a movement relative to the lower end of the guard. This relative movement may be obtained in any suitable type of extensible guard surrounding the needle but the preferred construction is one in which the device is tubular, coaxial with the needle and adapted to telescope vertically. The telescopic guard shown is designated generally by 9, and in the particular construction illustrated comprises four tubular sections associated in such a manner as to be capable of extension substantially to their maximum length when the needle-bar is at the top of its stroke and of being drawn in so that the needle-guard has its minimum length when the needle-bar is at the bottom of its stroke. The four sections illustrated are designated respectively by 10, 10', 10'', and 10'''. The four sections may be combined in any suitable manner to prevent their separation when extended while permitting them to telescope one within another. The guard as a whole may be supported in any proper
manner but in this case is fastened to the needle-bar so that the major portion of the needle-guard will move up and down with the needle-bar and the needle. In the specific construction illustrated the upper section 10 of the guard is connected directly to the clamp 7. This connection may be made in any suitable manner. Here the clamp has a pair of depending ribs, 11—11, at opposite sides thereof to which the section 10 of the guard is secured, as by means of set-screws, 12. Thus, when the sections 10, 10, 10 and 10 are properly connected for movement relative to one another without separating, it will be evident that the needle-guard as a whole will be suspended as a unit from the needle-bar. Its movements are intended to be controlled conjointly by the needle-bar and by a suitable element of the machine adjacent to the work. This element is in the present case the plate 9 through which the needle passes. When in operation the needle-guard will rest at its lower end, that is, the under side of the lowermost section 10 will rest upon the plate 9 and the upper sections 10, 10 and 10 of the needle-guard will move up or down more or less under the influence of the movement of the needle-bar.

For the purpose of maintaining the sections of the telescopic guard in proper working relation and permitting the proper relative movements thereof without the use of extraneous or additional devices for maintaining them in assembled condition, the various sections 10, 10, 10 and 10 are preferably so tapered that their tapered walls alone will maintain them in the proper working relation and prevent separation of the elements even when extended to their maximum length. In this case each of said elements is shown as tapered both internally and externally in order that the various sections may slide up and down freely and yet be positively prevented from separating even when the needle-bar is at the top of its stroke, and the guard extended to its maximum length. Obviously the slight taper of the inner and outer faces of the sections 10—10 will cause all of the elements to wedge together if the device is extended to its maximum length. When the needle-bar is at the top of its stroke and the lower end of section 10 in contact with plate 9 the parts will be about in position to wedge together.

The manner in which my improved needle-guard operates will, it is believed, be obvious. When in place with the machine operating the coaxial sections of the telescopic guard will be projected and drawn in under the influence of gravity and the needle-bar respectively as the latter ascends and descends as the weight of the sections is sufficient to maintain the various sections 10, 10 and 10 of the guard normally at the lower limit of movement thereof and they will be positively raised in the normal operation of the device only when the upper section 10 connected thereto is drawn up positively by the needle-bar.

The needle-guard will of course be so constructed as not to interfere with the threading of the needle or the proper operation of those parts of the machine with which it is intended to coact. The drawings show sufficient space beneath the thread-guide, 6, and above the upper edge of the section 10 of the telescopic guard to permit the thread to be passed through the needle-guard readily. As shown in the drawings the guard is detachable as a unit from the remainder of the mechanism. Obviously a guard of the type described may be secured in operative relation with the other parts in various ways.

What I claim is:
1. In a machine of the class described, the combination with a needle-bar and needle, and with a plate having a needle-opening, of a tubular needle-guard inclosing said needle substantially from the needle-bar to said plate and terminating at said plate and having a relative movement with respect to said needle and needle-bar and substantially stationary at its lower end with respect to said plate.
2. In a machine of the class described, the combination with a needle-bar and needle, and with a plate having a needle-opening, of an extensible needle-guard secured at its upper end to said needle-bar and inclosing said needle substantially from the needle-bar to said plate and normally resting at its lower end upon said plate.
3. In a machine of the class described, the combination with a needle-bar and needle, and with a plate having a needle-opening, of a telescopic needle-guard inclosing said needle substantially from the needle-bar to said plate and in operative relation therewith.
4. In a machine of the class described, the combination with a needle-bar and needle, and with a plate having a needle-opening, of a telescopic needle-guard inclosing said needle substantially from the needle-bar to said plate and having a relative movement at its lower end with respect to said needle and substantially stationary at its lower end with respect to said plate.
5. In a machine of the class described, the combination with a needle-bar and needle, and with a plate having a needle-opening, of a telescopic needle-guard secured to the needle-bar and inclosing said needle substantially from the needle-bar to said plate and in operative relation therewith.
6. In a machine of the class described, the combination with a needle-bar and needle, and with a plate having a needle-opening, of
a telescopic needle-guard secured at its upper end to the needle-bar and inclosing said needle substantially from the needle-bar to said plate and normally resting at its lower end upon said plate.

7. In a machine of the class described, the combination with a needle-bar and needle, and with a plate having a needle-opening, of a vertically disposed telescopic needle-guard surrounding said needle and normally extensible by gravity.

8. In a machine of the class described, the combination with a needle-bar and needle, and with a plate having a needle-opening, of a telescopic needle-guard surrounding said needle and comprising a plurality of sliding sections having means for limiting their relative longitudinal movement.

9. In a machine of the class described, the combination with a needle-bar and needle, and with a plate having a needle-opening, of a telescopic needle-guard surrounding said needle and comprising a plurality of coaxial sliding sections some of which are tapered to limit relative longitudinal movement of the sections.

10. In a machine of the class described, the combination with a needle-bar and needle, and with a plate having a needle-opening, of a vertically disposed telescopic needle-guard surrounding said needle and comprising a plurality of sliding sections having means for limiting their relative vertical movement, the uppermost of which sections is secured to said needle-bar.

Signed at New York in the county of New York and State of New York this 13th day of August A. D. 1914.

ISIDORE LEO MILLER.

Witnesses:

JOHN A. JONES,

C. S. CHAMPION.