

It is calculated that the battery will suffice for the sewing of a small family for one year. A professional seamstress would exhaust it more rapidly, but always in proportion to the exact amount of work done. It will be shown that this form of battery places the speed of the motor under complete control without effort on the part of the operator.

The attention of mechanicians is invited to the fact that this form of motor, owing to the force being applied equally to both sides of the shaft at once, entails absolutely no wear on the journals except from the weight of the armature, which is very light, and the tension of the belt, which transmits the power. The length of bearing is four times the diameter of the shaft, and the design of the motor is such that no amount of wear can cause the poles of the armature and magnets to come in contact, which was a frequent source of annoyance in other motors. The motor is attached to the machine, and is of such dimensions as to be readily concealed from view if preferred. There is also a device for readily changing the tension of the belt.

The power of the motor is sufficient to sew leather, or as much tightly woven linen as can be put under the presser. With a sufficient battery power it can give any speed varying from twenty to two thousand stitches per minute in instant obedience to the will of the operator. A safe working speed for constant use is eight hundred to one thousand stitches per minute, which is considerably faster than is now attained by professional sewing women, while others seldom sew more than three hundred to four hundred stitches per minute.

[The principles embodied in the paper were illustrated by a small model weighing  $2\frac{1}{2}$  pounds attached to a sewing machine and a battery of six cells, each containing one plate of zinc four inches long and two inches wide. The machine did both light and heavy work, and the speed was under complete control. The battery was sensibly constant, showing no signs of polarization. The current was estimated at two vebbers per second, and the force generated at 1000 ft. lbs.]

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**Vapor Tensions at High Temperatures.**—Sajotschewsky finds that vapor tension, up to the critical point, is independent of the space occupied by the liquids, but above that temperature the curves, which previously coincided, separated from one another when the quantity of liquid in a given space was made to vary.—*Proc. Vienna Acad.* C